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COMPUTERWORLD

CW'S ANNUAL MICRO AWARDS BALLOT PAGE 10

INSIDE

Spotlight — Sharing the wealth. Pullout section on DBMSs follows page 54.

In Depth — Work group computing creeps onto the scene. **Page 69.**

DCA to link up with Microsoft in extending OS/2 into the 3270 communications realm. Page 4.

DB2 update expected to appear at midyear, with referential integrity but no data dictionary. Page 8.

Judge Greene gives Bells go-ahead to offer regional value-added services. Page 6.

Cobol 85 compliance: Who's got it, and who hasn't. Page 103.

Netware users gain host services with connectivity package from Phaser. Page 8.

Cullinane rides shotgun at Cullinet, ends retirement to take vice-chairman position. Page 79.

Wrongful death suit reveals offers made to IBM's PC champion, the late Don Estridge. Page 2.

Mach 20 booster for 8088-based PCs ships out from Microsoft. Page 33.

Many hold off planning for impact of Open Network Architecture on voice and data networks. Page 16.

VAXs tuned for mainframe challenge

BY STANLEY GIBSON
CW STAFF

MARLBORO, Mass. — Casting aside pretenses of noncompetition with IBM, Digital Equipment Corp. announced a line of multiprocessing VAXs last week that challenge the lower end of IBM's 3090 mainframe line.

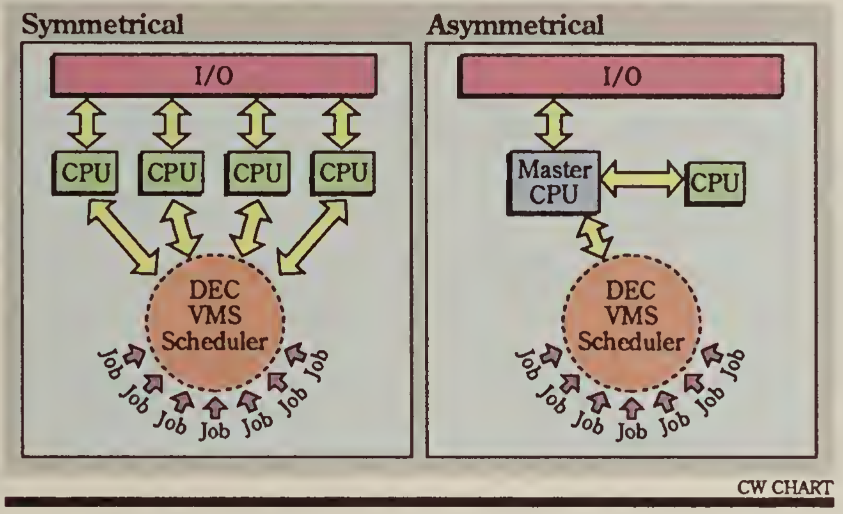
The systems, called the 8800 series, consist of one to four VAX 8700 CPUs offering one to 3.7 times the processing power of an 8700. The high-end four-processor VAX 8840 is capable of processing about 22 million instructions per second, according to estimates by market research firm International Data Corp. Enhancements to the VAX VMS operating system let the units act as peer multiprocessors, DEC said.

DEC Vice-President William Demmer publicly said last year that the company would announce such a mainframe-class VAX in 1988. The system carried the internal DEC code name of "Polar Star."

"Our goal is to match the best in the mainframe business," DEC President and Chief Executive Officer Ken Olsen declared. He said the new processors are the cornerstone of DEC's effort to sell to customers who have trusted only IBM in the past.

Peer relationships

Symmetrical multiprocessing eliminates the limitations of asymmetrical systems that rely on a master CPU to assign tasks and manage I/O



CW CHART

DEC claimed the systems require one-third the data processing staff required for IBM mainframes.

The systems, available immediately, will be shipped initially with a prerelease version of DEC's VMS Version 5.0, the full version of which will be announced in coming weeks, according to Demmer.

Users who purchase the system and the prerelease VMS Version 5.0 right away will get a free upgrade to the complete Version 5.0 when it becomes available, DEC officials said.

OLTP features coming

The complete version of the VMS upgrade has been expected to offer transaction processing features [CW, Oct. 12, 1987]. Referring to reports of an on-line transaction processing system that would run on the 8800 series, a DEC spokesman said such a system will be announced in the months ahead. DEC also promised a multiprocessing release of Ultrix, DEC's version of the AT&T Unix System V operating system, in the near future.

"Symmetrical multiprocess-

Continued on page 6

Lotus to unwrap integration scheme

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — An ambitious communications blueprint that ties together Lotus Development Corp.'s personal computer, data base server and mainframe products via a common data access interface is scheduled to be unveiled late this month.

According to informed sources, the interface will debut with the shipment of Lotus's previously announced 1-2-3 Release 3 early this summer. However, the product will also be an integral part of Lotus's future line of spreadsheet, data base and communications applications, the sources said.

The interface will reportedly allow spreadsheets and data bases to directly query a variety of host and PC applications while users remain within the familiar confines of the spreadsheet environment.

Sources said Lotus will use these planned communications capabilities as a lure for users considering other applications vendors. Lotus declined to comment on the upcoming announcement.

Lotus has announced a horde of still unavailable applications but has given only sparse details on how they will work together. Clearly, the company

Continued on page 103

Strategic systems plans gone awry

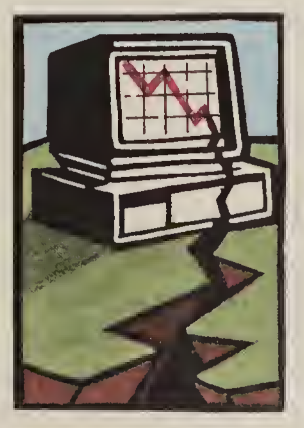
When the information blueprint is a lemon, costs can be staggering

BY GLENN RIFKIN and MITCH BETTS
CW STAFF

By 1985, there was chaos in New Jersey. The state's Division of Motor Vehicles had awarded a contract to Price Waterhouse to modernize its management and computer operations, but the plan was ill-defined and overly ambitious, a sure recipe for disaster. When the wrong programming language was used to implement a new driver registration system, more than a million New Jersey drivers were unable to register their cars or registered them incorrectly because of computer errors. A major investigation into the mess revealed that Price Waterhouse had "professionally misjudged" the implementation. The snafu cost the state $6.5 million.

When something goes wrong in information systems, it's hard to hide. A few highly publicized fiascoes have sent shivers down many an MIS manager's back as he whispers to himself, "I'm glad that wasn't me." The following are some examples of such cases:

- After nearly $5 billion spent, seven years invested and several major MIS casualties, Bankamerica Corp.'s foray into high technology has been nothing short of a disaster. The bank has lost tens of millions of dollars in various technological calamities, such as the failure of its Masternet, an $80 million program designed to automate the employee benefits and trust services department. The bank recently scuttled the entire system [CW, Feb. 1].



LES KANTUREK

According to the *San Francisco Examiner*, the failed attempt cost the bank $45 million as well as some important customers. It also reportedly cost Bankamerica's latest MIS chief, Louis Mertes, his job. All told, strategic MIS failures in the 1980s have helped Bankamerica slide from first place to 29th in assets of banks worldwide.

- The Internal Revenue Service's 1985 tax processing season was a data processing nightmare,

Continued on page 104

NEWSPAPER
SECOND CLASS

IN THIS ISSUE

Cooperation. Novell's campaign to establish Netware as a dominant mainframe connectivity solution gets a boost as Phaser unveils software to provide Netware users with access to a variety of IBM mainframe environments. Page 8.

Anticipation. Users anxiously await power, expansion options available with Apollo's yet-to-ship super workstation, the 62-bit Domain Series 10000. Page 103.

NEWS

4 Electronic publishing hot at FOSE '88.

4 DCA to reveal MS OS/2 strategy.

4 MSA attributes income drop to Irish subsidiary.

6 Federal court allows Bells to provide regional value-added net services.

6 Multiprocessing impossible without VMS enhancements, DEC says.

7 Arthur Andersen chooses Windows over Presentation Manager.

7 Unisys licenses Sun's Sparc architecture design.

8 DB2 expected to include referential integrity.

8 IBM's CSP upgrade prompts questions.

10 CW's Annual Microcomputer Awards ballot.

14 Users welcome PS/2 clones for variety of reasons.

14 Sun throws support behind CCITT X.400 electronic messaging standard.

15 General-purpose machines shine at Seybold Seminars '88.

15 Hunter designs spreadsheet for Unix-based multiuser systems.

16 Wary users put ONA plans on back burner.

17 Lotus revamps Metro, now uses less RAM.

17 Metaphor users to get Nielsen data on-line.

19 DG smoothes LAN migration with Bridge pact.

19 Teradata adds SQL support, Sun interface.

103 NBS certifies Cobol 85 compilers for variety of users.

105 IRS's private letter ruling complicates independent contractor status.

SOFTWARE & SERVICES

25 IBM's PR/SM offers options beyond VM.

25 Cameo singles out quality control managers.

25 Computer Associates aims accounting package at medium-size VAX users.

Distributed DBMS: A technology half full, not half empty. Follows page 54.

MICROCOMPUTING

33 Microsoft satiates power-hungry PC users.

33 Cognos's Powerhouse now speaks micros' language.

33 Micrografx adds support for Windows 2.0.

NETWORKING

45 Help wanted: Firms seek third parties to manage networks.

45 Raychem banks on AT&T transatlantic cable.

45 Financial services firms join to define standards.

45 Siemens, DEC to enhance local telephone services.

SYSTEMS & PERIPHERALS

57 IBM 8100 users choose different migration paths.

57 Corollary brings Xenix to the high end.

57 Sequoia bolsters Series 200 with TCP/IP support.

Quotable

"What you can do with these VAX systems continues to improve . . . but for the moment, we will continue to view the VAX as a mid-range machine."

DONALD BROUT
NABISCO BRANDS, INC.

See story page 1.

MANAGEMENT

71 Bottom-line philosophy motivates Seafirst MIS.

71 GE's Ehrlich favors pragmatism over promises.

COMPUTER INDUSTRY

79 Cullinane heads back to Cullinet.

79 CDLA President James Benton dies.

79 High-tech pirates reap billions.

79 Netlink grows in the shadow of SNA.

COMPUTER CAREERS

83 Competition heated in PC management world.

TRENDS

106 Industry information systems spending varies.

SPOTLIGHT

There are still many rough spots on the road to distributed DBMS.
Follows page 54.

IN DEPTH

69 Computers for project teams. An interview with Patricia Seybold. By Kelly Shea.

OPINION & ANALYSIS

21 Newquist says the pioneering spirit is alive.

25 Grochow makes a CASE for integration.

33 Barney wonders what would happen if users called the shots.

45 Keefe talks things out in the MIS department.

57 Connolly can't live on CPUs alone.

71 Trent visits the new intrapreneurs.

79 Zachmann answers Unix skeptics.

DEPARTMENTS

20 Editorial

76 Calendar

95 Marketplace

100 Training

106 Inside Lines

Career fears mount

Dispersed MIS operations are source of tension

BY JAMES CONNOLLY
CW STAFF

TARPON SPRINGS, Fla. — Fear of failure and fear of blocked career paths are key concerns in the minds of information systems professionals as their companies disperse MIS operations, according to a study commissioned by the Society for Information Management (SIM) Institutional Member Program.

The study, which examined human resources issues, also revealed that even within companies maintaining a centralized MIS approach, some of the most important human resources issues relate to creating a business orientation for MIS.

MIS executives said their concerns focus on having their workers acquire business orientations, encouraging managers to be businessmen rather than technologists and emphasizing creativity and innovation.

Results of the study were presented to the SIM Institutional Member Conference here last week by Easton, Conn., research group Cognitech Services Corp. Researchers surveyed 20 SIM member companies and 48 business units within those companies.

Cognitech researchers said that after identifying the top issues, they concentrated on those that relate to dispersed MIS operations. The motivation behind this was that they expect the dispersed strategy to become more common during the 1990s, particularly with more companies implementing strategic applications at the business unit level. Seven of the 20 firms said they had highly dispersed operations.

Learning to cope

Cognitech President Kay Lewis Redditt said some of the proactive firms participating in the study have found successful methods for dealing with the human resources problems relating to dispersion, while reactive companies have failed to do so. Redditt said that the challenge of managing a dispersion effort in itself creates problems. "One of the managers we talked to said he wakes up at night with knots in his stomach. He said he knows how to go about it but that he is worried it won't work," Redditt said.

MIS professionals in dispersed units find themselves needing new personal and business skills because they have to deal more closely with their users. This may leave them feeling frustrated in their career growth because they are removed from the central MIS operation.

Estridge spurned Sun, Apple

BY ALAN ALPER
CW STAFF

NEW YORK — The late Phillip "Don" Estridge, the IBM executive credited with turning the company's Personal Computer operations into a $5 billion business, spurned offers to take over the top jobs at Apple Computer, Inc. and Sun Microsystems, Inc., according to testimony and documents being considered in a wrongful death suit in federal court here.

Testimony began in court last week to determine monies to be awarded to the survivors of Estridge and his wife Mary Ann.

Estridge, the prime mover behind IBM's meteoric rise in the microcomputer business, and his wife were killed in an August 1985 crash of a Delta Air Lines jet landing at Dallas-Fort Worth Airport.

Estridge held the position of corporate vice-president of worldwide manufacturing at the time of his death.

IBM Chairman John Akers, who testified last week, suggested that had Estridge remained with IBM, he had the potential to enter top management and perhaps even head the company, according to a published report.

Akers also said Estridge had rejected an offer to become chief executive of Apple five or six years earlier, the report noted. Estridge also spurned a $16 million offer to join Sun, according to a brief filed by the plaintiffs. Sun declined to comment but is expected to give a videotaped deposition this week.

Estridge's survivors — three daughters and his mother-in-law — are seeking $25 million for his death and $5 million for the death of his wife, according to documents filed in the U.S. Court for the Southern District of New York. Testimony in the civil suit is expected to conclude this week.

Delta, which has acknowledged responsibility for the deaths, is disputing the amount it should pay but has not offered its own figure.

Depositions from Akers and IBM Vice-Chairman Paul Rizzo indicated Estridge could have accumulated $25 million in IBM earnings and benefits had he lived.

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Irish division tames MSA's annual gains

BY JAMES DALY
CW STAFF

ATLANTA — Losses from an Irish subsidiary continued to dog software vendor Management Science America, Inc. (MSA), which offset a jump in yearly revenue with a dramatic drop in net income and sagging fourth-quarter revenue, according to 1987 results released last week.

"We're attributing a lot of the drop to RTS," said William J. Laney, chief financial officer at MSA. "But they're getting back on track and . . . should break even by next year." MSA acquired Dublin-based minicomputer software vendor RTS Ltd. in April 1986.

While MSA's 1987 revenue leapt to $258.5 million, a 43% increase over 1986's $180.8 million, net income registered a loss of $221,000, or 1 cent per share, down from a profit of $13.2 million, or 73 cents a share, reported a year earlier.

Revenue for the fourth quarter ended Dec. 31 came in at $65.7 million, an 11% gain over the $58.7 million recorded in the same quarter a year earlier. However, the company posted a loss of $303,000, or 2 cents a share, down from a profit of $4.8 million, or 26 cents a share, for the same quarter in 1986.

DCA poised for OS/2 revelation

Development tie expected to provide Microsoft with 3270 link for OS/2

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Digital Communications Associates, Inc. (DCA) is expected to reveal its MS OS/2 connectivity strategy, along with a development alliance with Microsoft Corp., at a press conference here today.

The partnership will reportedly fill in the missing pieces of Microsoft's MS OS/2 strategy — IBM 3270 connectivity — while providing DCA with OS/2 support, according to analysts and sources close to DCA, who said that firm has been working with Microsoft for months.

Some analysts said they expect the announcement to provide the first alternative to the Communications Manager portion of IBM's OS/2 Extended Edition.

"I think that's stretching it a bit," responded Paul Maritz, general manager of Microsoft's Networking and Xenix Business Unit, who would only confirm that Microsoft President Jon Shirley will attend the press conference.

But at a July 1987 press conference, DCA joined Compaq Computer Corp., Ashton-Tate Corp. and others in saying that there would be alternatives to OS/2 Extended Edition. DCA also said it would provide an alternative in its niche market — 3270 emulation.

If the analysts are correct, the bottom-line importance for users is a future ability to piece together presumably less expensive and possibly enhanced Extended Edition capabilities, including Communications Manager features, from third parties, as opposed to purchasing proprietary software from IBM.

> "MICROSOFT is working diligently to point out that there is nothing proprietary or magical about OS/2 Extended."
>
> DAVID TERRIE
> NEWPORT CONSULTING

"That could be very attractive to users who don't want Presentation Manager and the data base part of Communications Manager," said Merv Adrian, managing editor of the *Focus Systems Journal* for Information Builders Publishing in New York.

"Microsoft is working diligently to point out that there is nothing proprietary or magical about OS/2 Extended," noted David Terrie, president of Newport Consulting.

DCA, based in Alpharetta, Ga., confirmed it will outline its OS/2 networking strategy but declined to comment further.

Analysts said announcement specifics will include support for Microsoft's MS OS/2 LAN Manager as well as software said to support both DCA's Irma 3270 emulation boards and IBM's Micro Channel architecture-compatible Token-Ring family, enabling users to choose their host-access path.

An IBM Advanced Program-to-Program Communications, or APPC, server capable of bridging OS/2-based work groups to IBM LU6.2-based environments is expected to come at a later date. DCA licensed LU6.2/PU2.1 technology from Communications Solutions, Inc. in August 1986.

An analyst who spoke recently with Steve Ballmer, vice-president of Microsoft's systems software group, said Ballmer agreed it would be "reasonable" to expect Microsoft to provide APPC support in the not-too-distant future.

DCA, which has close ties with 3Com Corp., has long been rumored to be working with Microsoft on 3270 connectivity.

Michael Murphy, editor of the "California Technology Stock Letter," reported that he sees the DCA-Microsoft alliance as an extension of the Microsoft-3Com strategy into the 3270 world.

Federal workers trade paper for desktop publishing tools

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Desktop publishing and high-volume electronic publishing are becoming the hot technologies in the federal government, the world's largest paper-generating enterprise.

Preliminary results of a survey by the U.S. General Accounting Office show that 34% of the civilian agencies have desktop publishing systems in operation and another 15% have them in prototype or pilot tests.

Furthermore, 32% of the civilian agencies have some form of high-volume electronic publishing system, and the U.S. Department of Defense has major electronic publishing initiatives under way, officials reported.

There was ample evidence of this trend at last week's Federal Office Systems Expo '88, or FOSE, from the well-attended educational sessions on desktop publishing to the keynote speech by John Sculley, chairman of Apple Computer, Inc.

In addition, Xerox Corp., based in Stamford, Conn., announced it has enhanced its Documenter office publishing system by providing it with multilanguage capabilities. Xerox hopes to capture more contracts with foreign service agencies, officials said, with this system that lets users process text in more than 40 languages and combine it with graphics for output on laser printers or electronic transmission.

The product, slated for availability in the second quarter of this year, is priced from $10,000 to $20,000, depending on the number of languages and storage capacity.

No stranger

Xerox has already made inroads into the potentially lucrative DOD market for large-scale publishing systems.

In January, Xerox announced contracts with the U.S. Navy's Printing and Publishing Service and the U.S. Air Force for the production of documents such as regulations, manuals, pamphlets and forms.

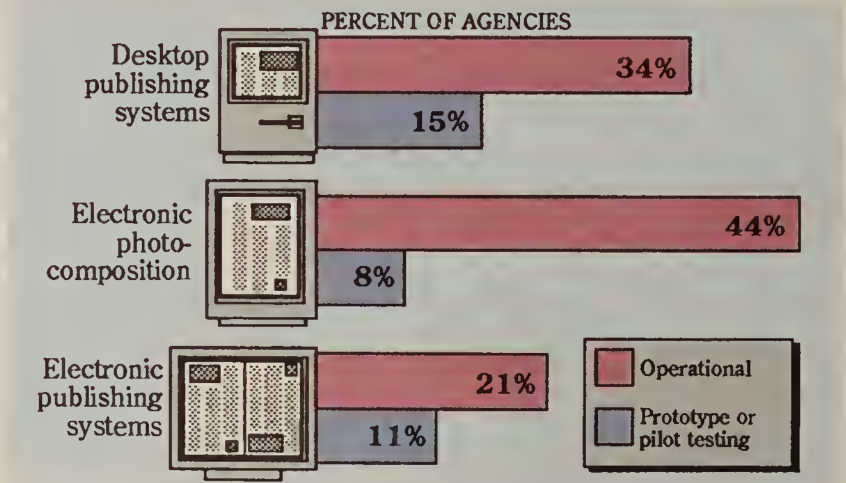
"More and more government RFPs [requests for proposals] are calling for publishing capabilities," said Clinton T. Newby, director of federal operations at Interleaf, Inc., a Cambridge, Mass.-based vendor of electronic publishing systems.

Interleaf's federal business has grown 75% a year for the last three years, Newby said.

In his speech at FOSE, Sculley acknowledged that Apple is best known in the federal government for desktop publishing. But he suggested that future opportunities in the federal market will come from desktop presentations, digitized mapping and the use of the Macintosh as a front-end "dashboard," or user interface, to existing mainframe systems.

Uncle Sam's print shop

A survey of 114 civilian federal agencies indicates a booming investment in electronic publishing technologies



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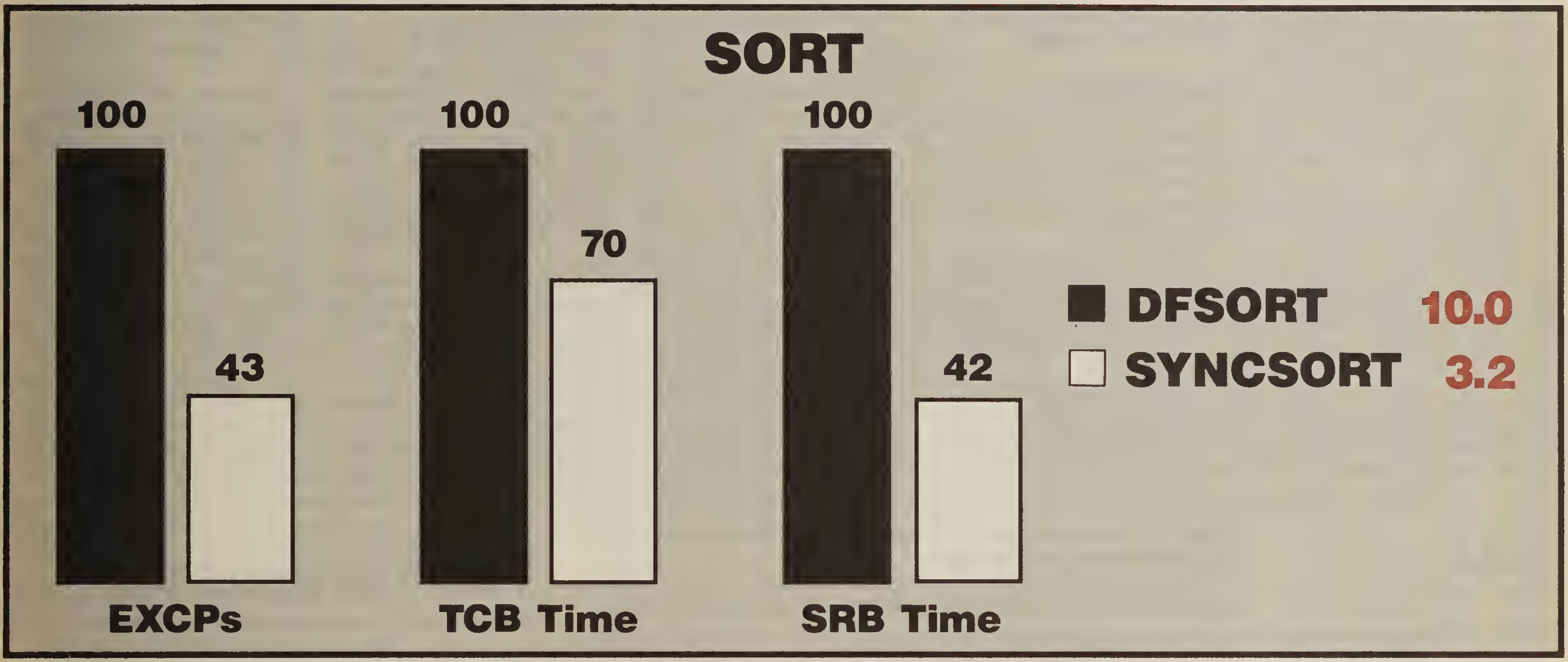

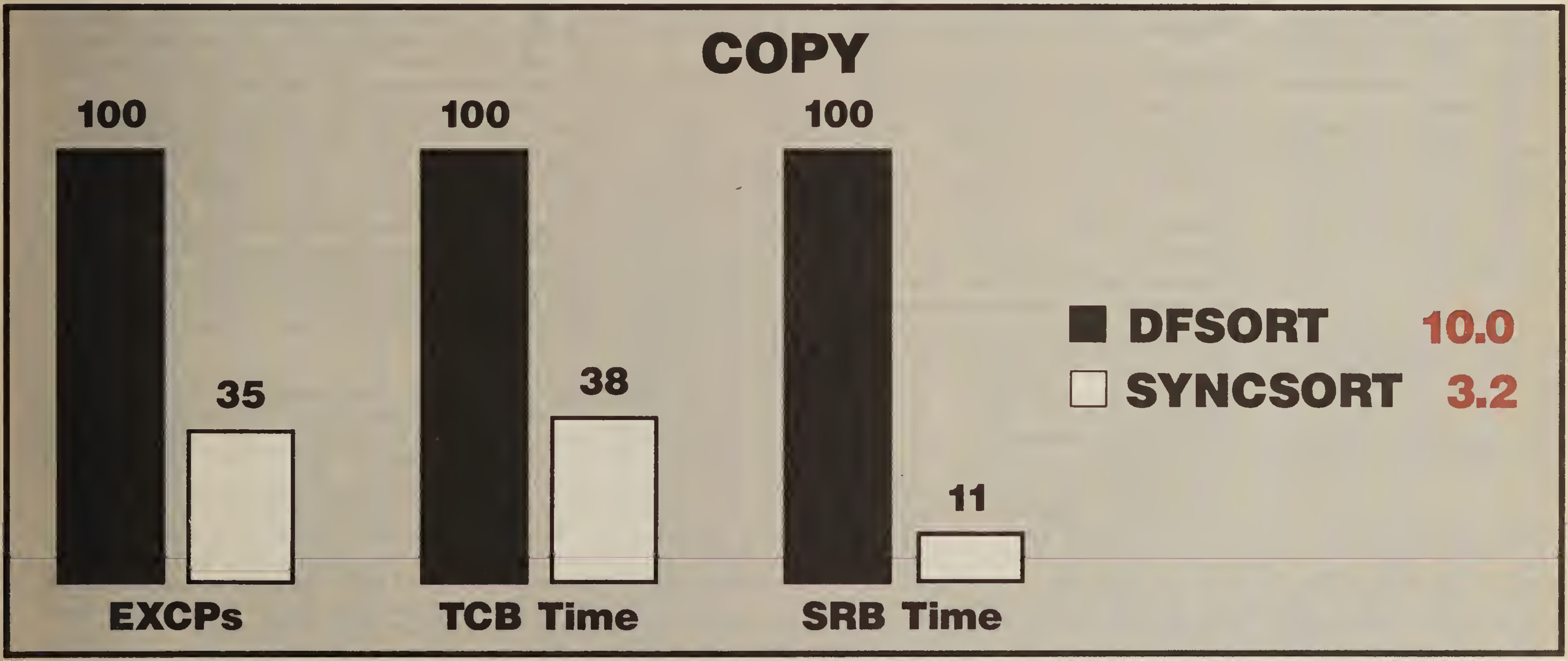

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Judge opens lines for Bell firms

Granting of regional value-added service rights could spark industry

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A federal court authorized the seven regional Bell holding companies last week to provide regional value-added network services, including electronic mail, data transmission, protocol processing, voice mail and videotex gateways.

The ruling set forth by U.S. District Judge Harold H. Greene could dramatically transform the shape of the information services industry, prompting some new competition as well as joint ventures with existing firms, analysts said.

Each of the holding companies posted a 1987 net income of roughly $1 billion. Alliances between the Bell companies and voice mail and videotex organizations will provide a much-needed financial and marketing boost to those fledgling industries, several industry experts said [CW, Sept. 21, 1987].

Open the gates

The most immediate effect of the ruling will be to allow several of the Bell companies to unleash the voice mail services they eagerly developed in anticipation of Greene's decision.

Pacific Telesis Group and Bell Atlantic Corp. have already been able to obtain Federal Communications Commission approval for voice storage and retrieval services.

Until now, the Bell companies were prohibited from entering the information services business by the Modified Final Judgment of the AT&T divestiture on the grounds that Bell offspring hold monopoly control over the local exchange.

But last September, Greene loosened that restriction somewhat, ruling that the Bell companies may transmit information but not originate or manipulate the information content [CW, Sept. 14, 1987].

In the supplemental order issued last week, Greene said the Bell operating companies may provide gateways for videotex and other information services as long as they are limited to six features: data transmission, address translation, protocol conversion, billing management, introductory displays and Help screens.

Because of the addition of electronic and voice mail to the package, Greene's ruling was more favorable than the holding companies had expected. They issued statements applauding the freedoms granted by the federal judge but said Greene should have gone further and removed all restrictions on information services.

Pleasant surprise

The freedom to offer E-mail was a surprise, sources said. Greene "just threw in electronic mail and didn't give any reasons for doing it," said Warner R. Sinback, manager of telecommunications affairs for GE Information Services, a Rockville, Md.-based unit of General Electric Co.

But Sinback and several analysts said they do not expect any dramatic changes in the E-mail industry, mainly because the Bell companies are still prohibited from offering any long-distance services.

The divestiture accord limits the Bell operating companies to services within their local-access and transport areas.

"The majority of electronic mail is long distance. Who knows what the market for local electronic mail is? If it's difficult to sell in the long-distance, corporate environment, you'll have a lot more difficulty selling it locally to small users," explained Mark Winther, a market analyst at Link Resources Corp. in New York.

However, the Bell companies may take the option of handing off their local traffic to long-distance carriers such as Telenet Communications Corp., just as they do with their local packet services, according to Gary Arlen, president of Arlen Communications, Inc., a Bethesda, Md., research firm.

John Morris, chairman of Dialcom Group, the Rockville-based electronic messaging unit of British Telecommunications PLC, said his firm is actively exploring alliances with the Bell operating companies.

VAXs

FROM PAGE 1

ing is only one component of Version 5.0, which will also include on-line transaction processing and additional communications features," said Stephen Widen, a DEC analyst at IDC. "They really aren't ready with all the features."

According to Demmer, the multiprocessing that is offered by the systems makes them well suited to most mainframe sites, where users have typically dedicated each of a mainframe's several processors to a separate task.

Existing VAX customers welcomed the added capabilities of the 8800 family and indicated that the features will be more useful to extend the range of their current VAX configurations than to oust any IBM mainframes.

In the name of science

At United Technologies Corp.'s Chemical Systems Division in San Jose, Calif., users have been waiting for the higher powered VAX 8800 systems to handle scientific applications, according to Phil Henderson, the firm's chief of engineering computing. The new release should allow the division to boost performance, he said.

With asymmetrical processing, "sometimes when you load up the system with interactive processes, you find you have less computing resources than you thought you did," Henderson said. But DEC's latest release is not likely to affect the corporate IBM shop at parent company United Technologies, he added.

Similarly, Donald Brout, staff vice-president of information technology at Nabisco Brands, Inc., said he does not expect the VAXs to push away any IBM mainframes — at least not immediately. "What you can do with these VAX systems continues to improve," he said, "and that means you will be able to do a much larger application on VAXs than you could before.

"DEC has very realistically made the point that you can grow by adding to your Vaxclusters, but for the moment, we will continue to view the VAX as a mid-range machine," Brout added. Nabisco, a division of RJR Nabisco, Inc., maintains 12 IBM 3090s in three locations.

An I/O of one's own

With symmetrical multiprocessing, each processor can initiate its own I/O, thus speeding throughput, DEC's Demmer said. With previous asymmetrical processing, such as that in the dual-processor 8350 model, one processor had to initiate all I/O.

In addition, the multiprocessing feature included in VMS Version 5.0 is said to dynamically balance the computing work load for the various processors. To further boost throughput, additional VAXBI buses are offered on each 8800 family member; up to four are available for the 8810, and up to six are available on all other models.

Also, the 8840 can contain up to 512M bytes of memory. "IBM only offers one-half that on its largest mainframes," Demmer said.

To achieve parallel processing and gain greatly increased throughput on a single application, programs will have to be "decomposed" to run on the different processors in parallel, Demmer said.

The processors, numbered 8810, 8820, 8830 and 8840, are upgradable to more powerful members of the same family. DEC announced a preconfigured cluster, consisting of two dual-processor 8820s, called the VAX 8842. The systems are priced from $543,900 to more than $1.7 million; all upgrades cost $280,000.

Midwest correspondent Jean S. Bozman contributed to this report.

Mainframe challenge

With the release of the multiprocessing VAX 8800 series, DEC powers up to challenge the lower end of IBM's 3090 mainframe line

	Number of VAX 8700 processors	VAXBI buses	Memory range (in bytes)	MIPS*	Base price
VAX 8810	One	One to four	48M to 512M	6	$543,900
VAX 8820	Two	Two to six	128M to 512M	11.4	$833,700
VAX 8830	Three	Two to six	128M to 512M	16.8	$1.1M
VAX 8840	Four	Two to six	128M to 512M	22.2	$1.5M
VAX 8842 cluster	Four	Four to 12	256M to 1G	22.2	$1.6M

* Millions of instructions per second, estimated by International Data Corp.

CW CHART

VMS 5 on launch pad

According to Digital Equipment Corp., symmetrical multiprocessing on its VAX systems would be impossible without enhancements to VMS. Those enhancements are included in the prerelease version of VMS Version 5 that is being sold with the new 8800 series of multiprocessors, DEC said last week.

A DEC spokesman said the reason for the incomplete release of VMS 5 is that it has been tested thoroughly only on the 8800 series and not yet on all other VAXs. When it is ready to run on other processors, it will be formally announced and made generally available, he said.

Users of the previously offered dual-processor VAX 8350 and VAX 8800 systems will gain the peer multiprocessing capability by running VMS 5 when it becomes available for them, according to DEC. One beta-test user said he has been operating an 8350 as a symmetrical multiprocessor under a test version of VMS 5.

High performance, low overhead

DEC said an 8800 system running VMS 5 will gain 25% to 30% better performance for the firm's All-In-1 office automation package. The company also said the 8800, which consists of two 8700 CPUs, offers the same performance as a VAX 8820, which also contains two VAX 8700 CPUs.

Bob Meihofer, director of operations at Grumman Corp.'s Data Systems Division in Calverton, N.Y., has been evaluating a four-processor VAX 8840 system for several months. He said performance gains from the system tend to depend on whether the application run is "I/O intensive."

However, Meihofer observed that operating system support of symmetrical multiprocessing does not take up a large amount of overhead. "It's less than 10%. They [DEC] did a good job of keeping it low," he said.

The 8840 consistently offered 3.6 times the performance of a single 8700, a result Meihofer said is not far out of line with DEC's claim of 3.7 times the performance.

He said the 8840 offered 15.4 times the throughput of a VAX 8200; one of his jobs that took 77 minutes on a VAX 8200 took only five minutes on the 8840. The 8200 reportedly offers approximately 1 million instructions per second (MIPS) performance; therefore, the 8840 performed the work at a rate of 15.4 MIPS.

Meihofer also said programmers in his shop have been adapting, or "decomposing," some computation-intensive jobs to be processed on the 8840 in parallel, a task he said did not appear to be inordinately difficult.

STANLEY GIBSON

Big Eight firm shines to Windows, wards off OS/2

BY STEPHEN JONES
CW STAFF

CHICAGO — A major division of Arthur Andersen & Co. last week committed itself to a wholesale switch over to Microsoft Corp.'s Windows operating environment, passing up for now the promises of Microsoft's Presentation Manager component of OS/2.

The plan requires scuttling 4,000 copies of Lotus Development Corp.'s 1-2-3 spreadsheet in favor of Microsoft's graphics-based Excel program.

While the accounting firm did not rule out the chance of eventually migrating to OS/2 Standard Edition 1.1 with the Presentation Manager, Andersen officials said they expect to run Microsoft MS-DOS applications in the Windows environment for the next two to three years.

Instant gratification

Andersen's audit division, which owns about 4,000 personal computers, opted for Windows because it wants to take advantage of the software's graphical user interface. Although the Presentation Manager will offer a nearly identical interface when it ships this fall, Andersen planners said it could take two years before enough applications are available to run the operating system effectively.

"If we're convinced we're going to a new user interface, why should we wait another two years for Presentation Manager to come around?" asked Jack Dreiss, director of development for the advanced computer audit techniques group.

Dreiss said the audit division decided to support Windows to save money on training costs and give users true multitasking capabilities. He estimated that the graphical interface can reduce user training time by 40% when compared with the C-prompt interface of character-based machines. He said the Windows interface should save the division about $2 million per year in PC training costs.

With many Fortune 1,000 companies casting a skeptical eye toward OS/2, the announcement by a leading member of the Big Eight accounting group could inhibit acceptance of the operating system. But some industry observers said the benefits of the Presentation Manager will eventually outweigh any short-term gains associated with Windows.

"If they're trying to solve business problems today, then going to Windows makes sense; but Presentation Manager is really the wave of the future," said John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass.

New on the block

In addition to Excel, Andersen's audit division will adopt a new line of Windows-based applications, including a data base program, a word processor and such internal programs as financial statement, planning and budgeting systems.

Dreiss said the migration will take a total of 18 months to complete.

The greatest challenge facing Andersen with the Windows swap could be weaning its installed base off 1-2-3. Andersen, a longtime 1-2-3 user, started looking for alternatives when Lotus said it would not support the Windows environment. Andersen's MIS staff polled about 50 top users on the move to Excel and, according to Dreiss, received mostly favorable responses. Beginning June 1, current 1-2-3 users will participate in a four-hour transition course for Excel.

Dreiss said he expects to win over old-time 1-2-3 users by letting Excel sell itself. "To say the migration is not a challenge would be naive, but we have an excellent product to work with, and it's clear we're headed in the right direction."

Sparc to fire up Unisys Unix line?

BLUE BELL, Pa. — Joining a growing nucleus of computer vendors, Unisys Corp. announced last week that it has signed an agreement with Sun Microsystems, Inc. to license Sun's Scalable Processor Architecture (Sparc) microprocessor design.

AT&T announced last fall that it had licensed the Sparc design from Sun. Xerox Corp. has signed a similar agreement. Sun has licensed Sparc to three semiconductor manufacturers — Fujitsu Microelectronics, Inc., Cypress Semiconductor Corp. and Bipolar Integrated Technology — for sale on the open market.

"We have just signed a license agreement, but we haven't made a determination as to what specifically to do. We are looking at a high-performance workstation and a large Unix system," said Fred Meier, vice-president of corporate program management at Unisys.

Unisys examined other reduced instruction set computing (RISC) architectures and may yet commit to other RISC designs as well, Meier added.

Unisys also said it is working with AT&T to enhance the commercial functionality of the open Applications Operating Environment for AT&T's Unix System V. Meier said discussions with AT&T have concerned incorporating other flavors of Unix in the Posix standard and in Unix System V, Release 4.

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Phaser opens host services to Netware

BY ELISABETH HORWITT
CW STAFF

SAN FRANCISCO — More than a year of joint development work by Novell, Inc. and Phaser Systems, Inc. bore fruit last week when Phaser announced software said to provide Novell Netware users with access to a variety of IBM mainframe environments.

Phaser announced two software offerings. Phaser Systems Application Manager/Net (PSAM/Net) connects IBM Personal Computers and Personal System/2s to a wide variety of IBM host resources and services through the IBM Systems Network Architecture (SNA)/VTAM environment. PSAM/LAN allows users to access PSAM/Net functions through Novell's Netware local-area network server.

Software components running on workstation, server and mainframe allow users to accomplish the following:

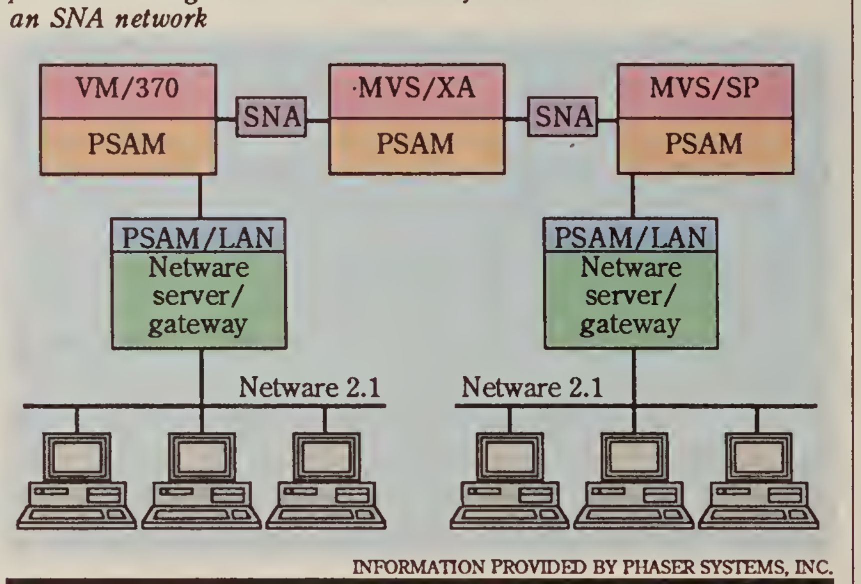
- Initiate, control and retrieve batch jobs through IBM's JES2 or JES3.
- Run application sessions in IBM's CICS, IMS or VM/CMS.
- Access data across several different mainframes via IBM's Intersystem Communication program.
- Set up virtual floppy disk files on the host of up to 250M bytes.
- Access resources on multiple hosts and Netware servers across an SNA network.
- Access virtual printer services and floppy disks via IBM's Extended Communication Facility/Server-Requester Programming Interface.

Novell presented PSAM/LAN to its customers at a series of seminars that emphasized Netware's growing attachments to hosts and other types of networking environments.

"This is the first Novell seminar I've seen where they're emphasizing mainframe connectivity rather than just LANs," said Joyce Kellogg, a Netware user from Gould, Inc.'s Quality Control department. "They must have realized that sooner or later, you run out of room on a server."

Reaching up

The Phaser Systems Application Manager/LAN allows Novell Netware users to store and access files on IBM mainframes and provides routing services to other mainframes and servers across an SNA network



INFORMATION PROVIDED BY PHASER SYSTEMS, INC.

Products such as PSAM/LAN will help Novell in its campaign to establish Netware 2.1 as a dominant mainframe connectivity solution before IBM has a chance to dig in with its OS/2-based connectivity strategy, said Eric Killorin, president of Hyatt Research Corp. in Andover, Mass. Archrival 3Com Corp. has forged "much closer ties to OS/2" through its alliance with Microsoft Corp., Killorin said.

Part of the plan

Netware will run OS/2 as a guest operating system on a coprocessor board and support software written for IBM's application programming interfaces to OS/2; however, the need to go through Netware to get at OS/2 may prove costly in terms of memory and processing overhead, Killorin said.

PSAM/LAN's mainframe-based virtual disk services could be extremely useful to Novell customers, according to Gould technical services manager Michael Kobos. By having users store files on the mainframe, MIS can enforce backup and security standards that "users who store data on PCs don't adhere to," he said.

Phaser recently emerged from Chapter 11 proceedings by becoming 100% privately owned by Novell Chief Executive Officer Raymond Noorda.

However, the company will remain completely independent and is already approaching other LAN vendors about migrating Phaser to their systems, according to Phaser President John Mullen.

A likely next version of PSAM/LAN will support DOS 3.1 networks such as 3Com's, a Phaser spokesman said.

Products the vendor plans to introduce later this year will add support of IBM LU6.2 peer-to-peer networking and transaction processing across IMS, CICS and SQL systems.

PSAM/LAN is scheduled for release in May. A 10-user version of the Netware portion of the software is set to cost $2,500.

IBM mainframe software for unlimited users will cost from $3,000 to $15,000. PSAM/Net is priced between $7,000 and $40,000 and is scheduled to be available in early June.

DB2 booster shot nears

BY ALAN ALPER
CW STAFF

NEW YORK — IBM is expected to deliver a limited implementation of referential integrity in its upcoming release of DB2 but will not be able to provide an active data dictionary before next fall, according to industry observers.

In its next iteration, expected between early May and late June, DB2 is expected to be capable of detecting changes made to interrelated data in multiple tables. DB2's current lack of referential integrity — changing one field and having it correlate with the same data in another — has kept it from being used in mission-critical applications at many IBM shops, observers have said.

Under the current DB2 release, for example, the system would allow the deletion of a customer from a table without referencing an outstanding account, noted Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

"There will be some content integrity," Atre said of the impending DB2 release, "but no foreign key support." A foreign key is a field in a record that can be used to locate another record where it serves as the primary key or unique identifier.

No domain support

While it is unclear whether IBM will call the next iteration Release 3.2 or Release 4, it is fairly clear that DB2 will still not support domains. A domain is a set of related data that cuts across multiple tables.

The new release, Atre said, will also stress reliability, availability and serviceability. "IBM wants to make [DB2] so robust that customers will feel comfortable putting production systems on it," Atre asserted.

IBM is not expected to provide a long-anticipated and much-needed active data dictionary until next fall at the earliest, analysts agreed. "You won't see a sweeping repository," said Michael Braude — vice-president of software management strategies at Stamford, Conn.-based Gartner Group, Inc. — concerning the upcoming release. "IBM still will not yet have a world-class development environment, such as what we see in other data base management systems."

'Cumbersome tool'

In Release 3, which debuted in May 1987, IBM offered a directory, or extension to the DB2 catalog, that it called DB RAD, which details data relationships but does not function as a full data repository.

Users contend DB RAD is at best a stopgap measure. "They tried to stick their fingers in the dike with DB RAD, but it is a cumbersome tool," noted Andrew Galat, a consultant with Computer Partners, Inc.

In a presentation at the Connect '88 conference here last week, the Gartner Group's Braude sketched out his interpretation of IBM's distributed data base directions for DB2. Braude said the process began with IBM's release late last year of TSAF, a mechanism that provides access to data across IBM VM-based machines, and will continue later this year with the release of IBM's OS/2 Extended Edition. IBM will elevate DB2's distributed capabilities when it unveils its R-Star technology, which is said to provide access to data bases distributed on machines with the same architecture. R-Star, however, is not expected to make its appearance until 1990, Braude said.

IBM is also developing technology under the project name of Starburst that is said to provide access to data residing in data bases across a variety of IBM and non-IBM computing architectures. So-called vertical, heterogeneous distributed DBMS technology will be made available under DB2 sometime in the 1993 time frame, Braude said.

He cautioned users not to cast these dates in stone. "I think the schedule is subject to slippage, based on developments in the past. DB2 has not moved ahead as fast as I thought it would," Braude said.

CSP upgrade fails to resolve nagging issues

BY CHARLES BABCOCK
CW STAFF

An unheralded IBM announcement last month upgraded the firm's "strategic" fourth-generation language and application generator to make the product a more effective tool in mainframe environments.

The recent additions, however, still leave Cross System Product (CSP) with no visible way of addressing IBM's mid-range systems, even though it is a product in IBM's Systems Application Architecture (SAA).

At the same time, IBM appears serious about establishing CSP as a major product in its limited application-building tool set. In a move reminiscent of its special offer on DB2, IBM has lowered CSP's price — it is sold as two products, CSP/Application Development and CSP/Application Execution — from the $42,000 to $60,000 range for the two products to a range of $12,000 to $30,000 for both.

CSP Release 3.2 expands its linkages to existing mainframe applications and data. It also provides enhancements that allow applications written in CSP to execute more efficiently from IBM VM/CMS files, according to product sheets sent to IBM customers. But observers familiar with application development tools have raised the following questions about CSP:

- The announcement did not address CSP users' desire to store CSP applications in MVS-partitioned data sets, where they frequently exercise change control constraints over source code programs. Instead, CSP applications must be stored in the CSP library. "It is not possible to use the partitioned data sets. That is a Guide/Share requirement and will be a direction of the product in the future," said an IBM spokesman in Rye Brook, N.Y.
- Although CSP is frequently cited as an application developer for DB2, critics point out that its dictionary still has highly limited compatibility with DB2's catalog. The CSP dictionary can use data from DB2 for data definitions, but changes to definitions in one cannot be automatically imposed on the other.

A common repository for CSP and DB2 "is a customer requirement. It is a future objective," the IBM spokesman said.

- There has been no indication from IBM on how CSP can be used on its mid-range systems — the System/36, 38 and the yet-to-be-announced Silverlake — as required in order to be in compliance with SAA. "CSP's direction is to become a product for all three hardware environments," the IBM spokesman said.

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[†] *Digital News*, December 1, 1986. [‡] Gartner Group currently available research.
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2 ☐ Compaq 386/20, *Compaq Computer Corp.*
3 ☐ PS/2 Model 50, *IBM*
4 ☐ PS/2 Model 80, *IBM*
5 ☐ PC's Limited 386/16, *PC's Limited*
6 ☐ Premium 386, *AST Research, Inc.*
7 ☐ Tandy 4000, *Tandy Corp.*
8 ☐ Leading Edge Model D2, *Leading Edge Hardware Products, Inc.*
9 ☐ Pac 286, *Tandon Corp.*
0 ☐ Powermate 386, *NEC Information Systems, Inc.*
x ☐ 6386 Workgroup System, *AT&T*
y ☐ Vectra RS/20, *Hewlett-Packard Co.*
6- 1 ☐ Other ____________

Best Laptop/Portable

7- 1 ☐ 1400 LT, *Tandy Corp.*
2 ☐ Wang Laptop Computer, *Wang Laboratories, Inc.*
3 ☐ Gridcase EXP, *Grid Systems Corp.*
4 ☐ PC-7221, *Sharp Electronics Corp.*
5 ☐ Portable III, *Compaq Computer Corp.*
6 ☐ Multispeed HD, *NEC Information Systems, Inc.*
7 ☐ Portable Powermate, *NEC Information Systems, Inc.*
8 ☐ PC Convertible Model 3, *IBM*
9 ☐ Toshiba T5100, *Toshiba America, Inc.*
0 ☐ Other ____________

Best Local-Area Network Product

8- 1 ☐ 1-2-3 Networker, *Lotus Development Corp.*
2 ☐ 3+ Version 1.2, *3Com Corp.*
3 ☐ Appleshare PC Software, *Apple Computer, Inc.*
4 ☐ Vines 386, *Banyan Systems, Inc.*
5 ☐ Vines 3.0, *Banyan Systems, Inc.*
6 ☐ Appleshare 1.1, *Apple Computer, Inc.*
7 ☐ Inbox, *Think Technologies*
8 ☐ Quadstar, *Quadram Corp.*
9 ☐ 386A File Server, *Novell, Inc.*
0 ☐ Alliance ZSL, *Avatar Technologies, Inc.*
x ☐ Proteon-4, *Proteon, Inc.*
y ☐ Carbon Copy Plus, *Meridian Technology, Inc.*
9- 1 ☐ 3Station, *3Com Corp.*
2 ☐ PC Network Program Version 1.2, *IBM*
3 ☐ Etherlink/MC, *3Com Corp.*
4 ☐ Network Card Plus, *Hercules Computer Technology, Inc.*
5 ☐ The LAN Workplace, *Tecmar, Inc.*
6 ☐ Other ____________

Most Useful Micro-Mainframe Link Product

10- 1 ☐ TAC Release 2, *Lotus Development Corp.*
2 ☐ Helix VMX, *Odesta Corp.*
3 ☐ Irma 2, *Digital Communications Associates, Inc.*
4 ☐ Irmalan 3725 Gateway, *Digital Communications Associates, Inc.*
5 ☐ Adapt3274, *Network Software Associates, Inc.*
6 ☐ IBM PC Network Integration Package, *Digital Equipment Corp.*
7 ☐ Multi-PC/3270, *Anex Technology, Inc.*
8 ☐ Clusternet II, *Intelligent Technologies International Corp.*
9 ☐ Multiplex/XL, *Network Innovations Corp.*
0 ☐ Ideacomm 5250/Remote Gateway, *Ideassociates, Inc.*
x ☐ Dbase Direct/36, *Ashton-Tate Corp.*
y ☐ Tempus-Share, *Micro Tempus, Inc.*
11- 1 ☐ Attachmate Extra, *Attachmate Corp.*
2 ☐ Maxess SNA Gateway, *Communications Solutions, Inc.*
3 ☐ Access/QLLC, *Eicon Technology Corp.*
4 ☐ Touch Terminal, *Touch Communications, Inc.*
5 ☐ Other ____________

Best PC Expansion Board

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2 ☐ Inboard 386, *Intel Corp.*
3 ☐ Mac 286, *AST Research, Inc.*
4 ☐ Curam, *Cumulus Corp.*
5 ☐ Hard Card 40MB, *Plus Development Corp.*
6 ☐ Cardrive, *Innovative Devices, Inc.*
7 ☐ Paradise Autoswitch EGA-480, *Paradise Systems, Inc.*
8 ☐ Gammafax Plus, *Gammalink*
9 ☐ Advantage/2 I/O Board, *AST Research, Inc.*
0 ☐ Orchid Ramquest 50/60, *Orchid Technology, Inc.*
x ☐ R-Card 45, *Rodime, Inc.*
y ☐ Vega VGA, *Video Seven, Inc.*
13- 1 ☐ Quad386XT, *Quadram Corp.*
2 ☐ Other ____________

Most Innovative New Software Product

14- 1 ☐ OS/2, *IBM and Microsoft Corp.*
2 ☐ Professional Oracle, *Oracle Corp.*
3 ☐ PC Excel, *Microsoft Corp.*
4 ☐ R:Base for DOS, *Microrim, Inc.*
5 ☐ Word 4.0, *Microsoft Corp.*
6 ☐ Works, *Microsoft Corp.*
7 ☐ Quattro, *Borland International*
8 ☐ Designer, *Micrografx, Inc.*
9 ☐ Byline, *Ashton-Tate Corp.*
0 ☐ SAS System for Personal Computers, *SAS Institute, Inc.*
x ☐ Demo 2, *Software Garden, Inc.*
y ☐ Autocad AEC Mechanical, *Autodesk, Inc.*
15- 1 ☐ Cricket Graph, *Cricket Software*
2 ☐ Hypercard, *Apple Computer, Inc.*
3 ☐ Surpass, *Surpass Software*
4 ☐ Quickbasic 4.0, *Microsoft Corp.*
5 ☐ @Liberty, *Softlogic Solutions, Inc.*
6 ☐ Wordperfect 5.0, *Wordperfect Corp.*
7 ☐ Graphwriter 2, *Lotus Development Corp.*
8 ☐ Windows 2.0, *Microsoft Corp.*
9 ☐ PC-MOS, *Software Link, Inc.*
0 ☐ Multimate Advantage II, *Ashton-Tate Corp.*
x ☐ Windows/386, *Microsoft Corp.*
y ☐ Reflex Plus, *Borland International*
16- 1 ☐ Concurrent DOS 386, *Digital Research, Inc.*
2 ☐ Other ____________

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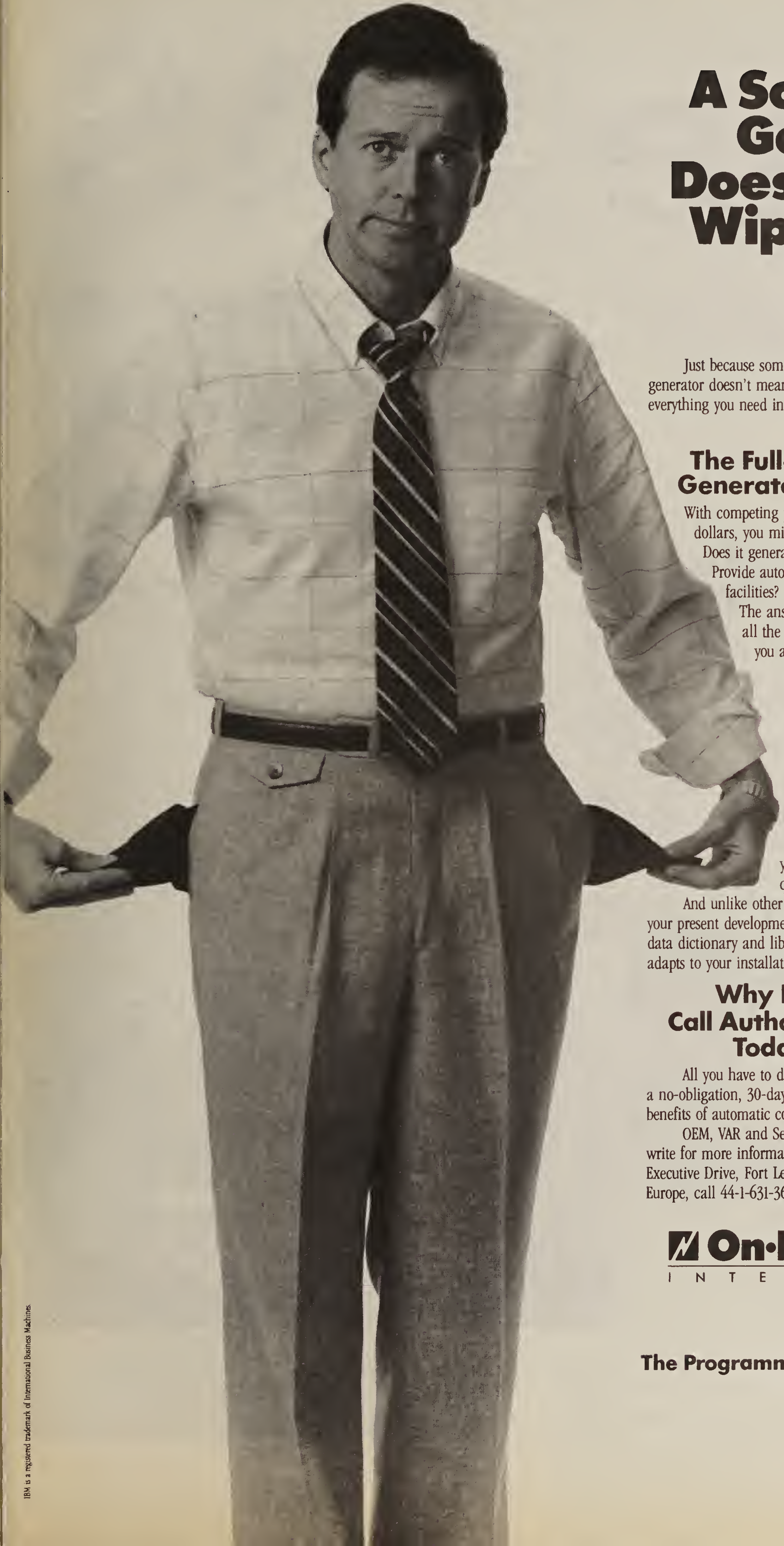

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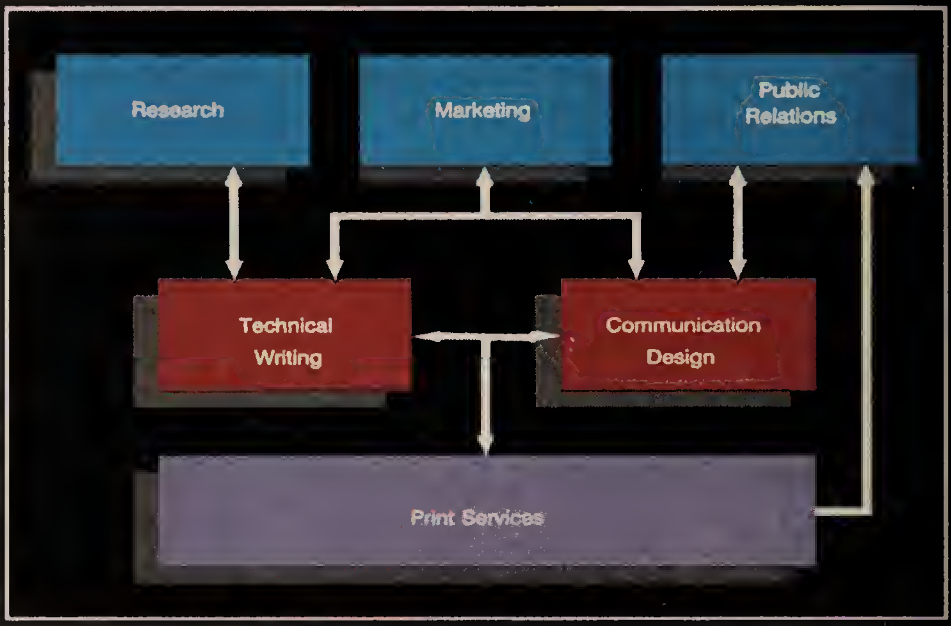

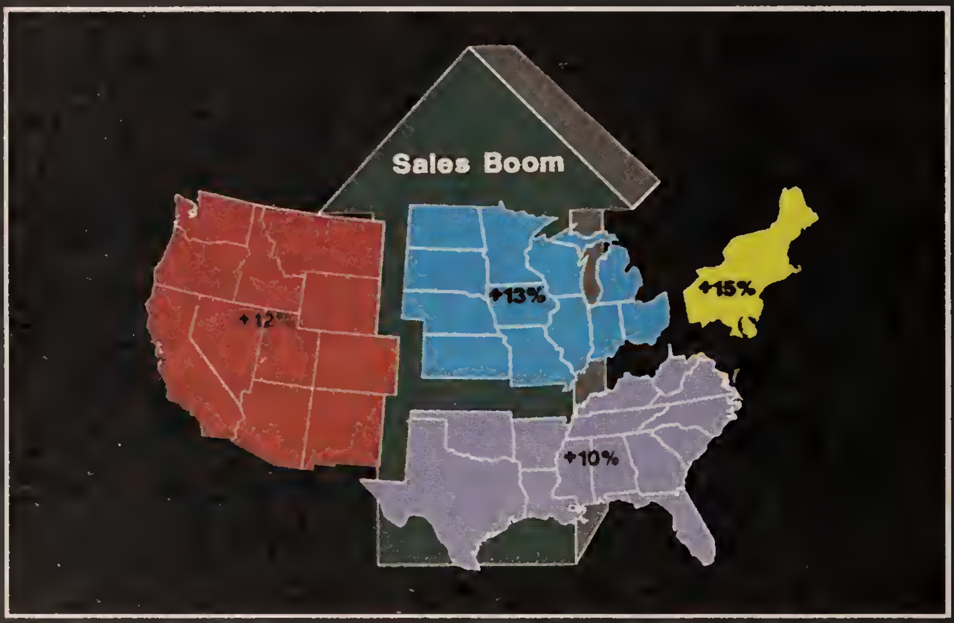

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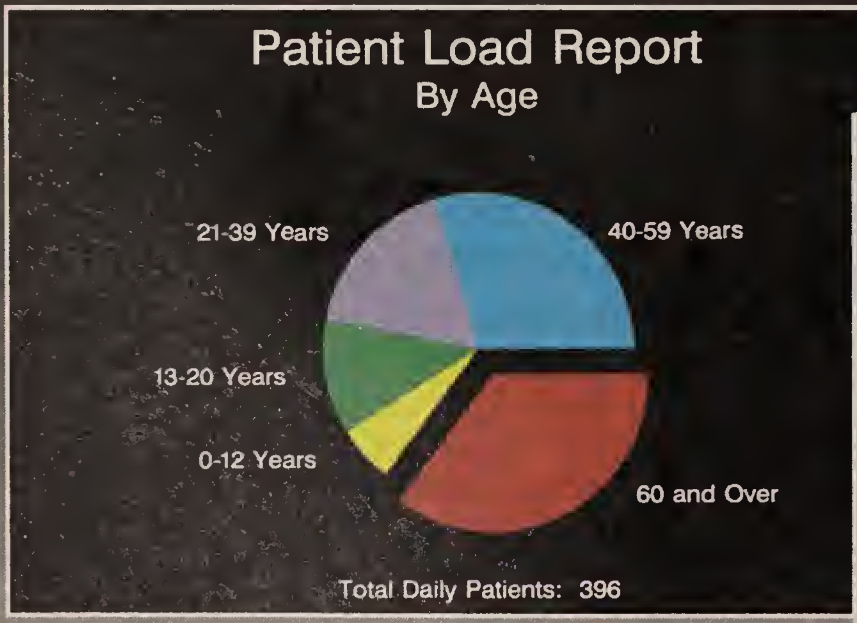

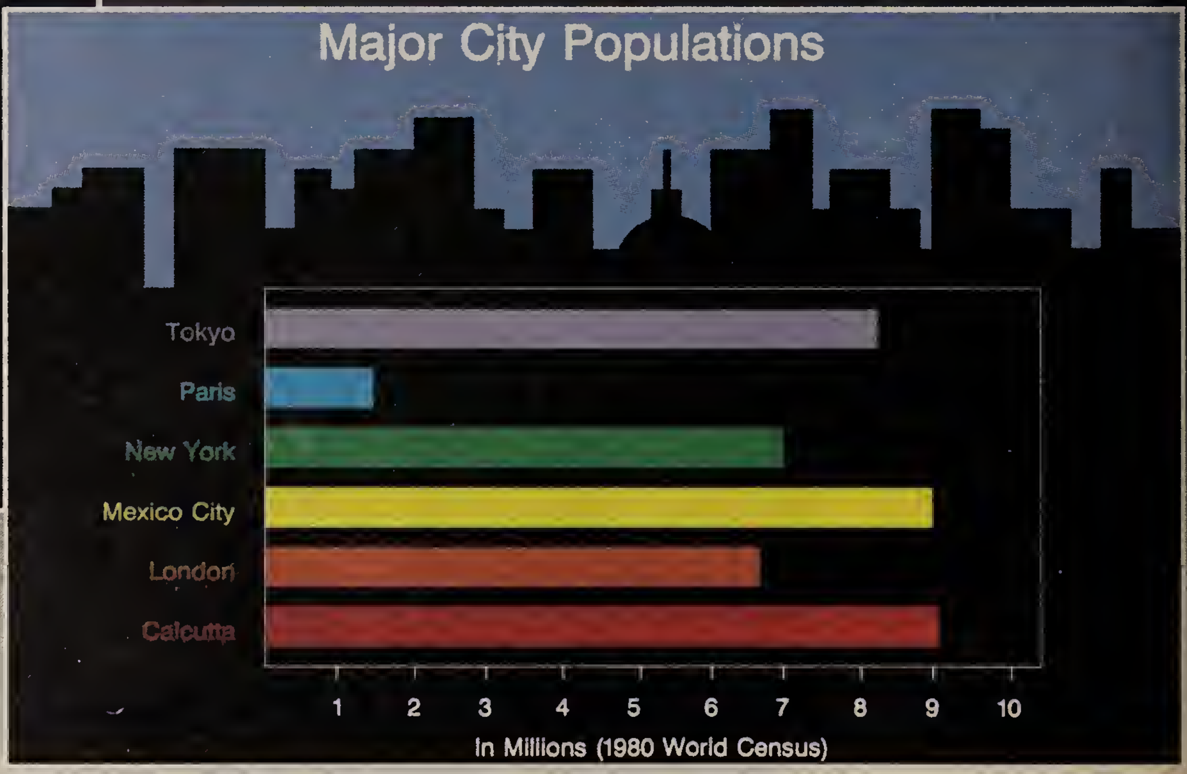

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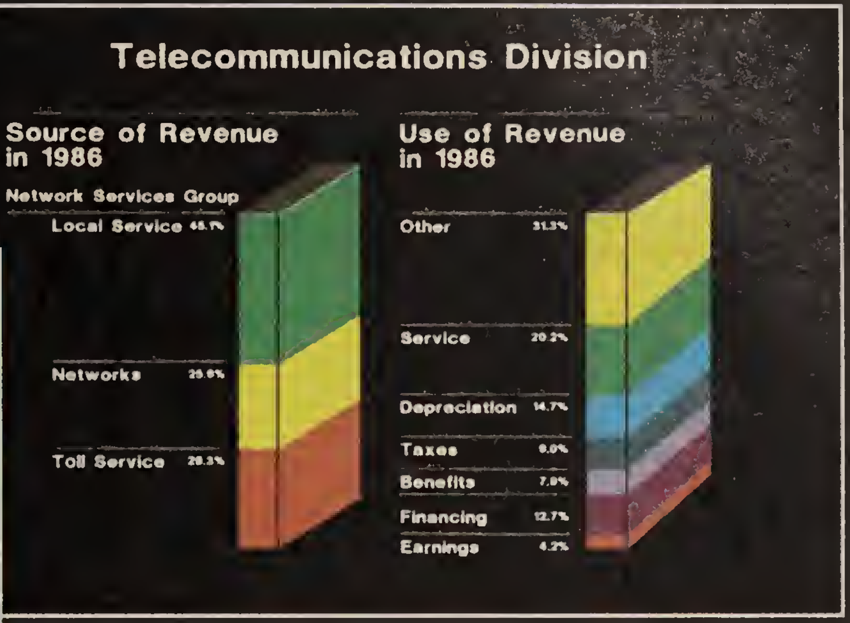

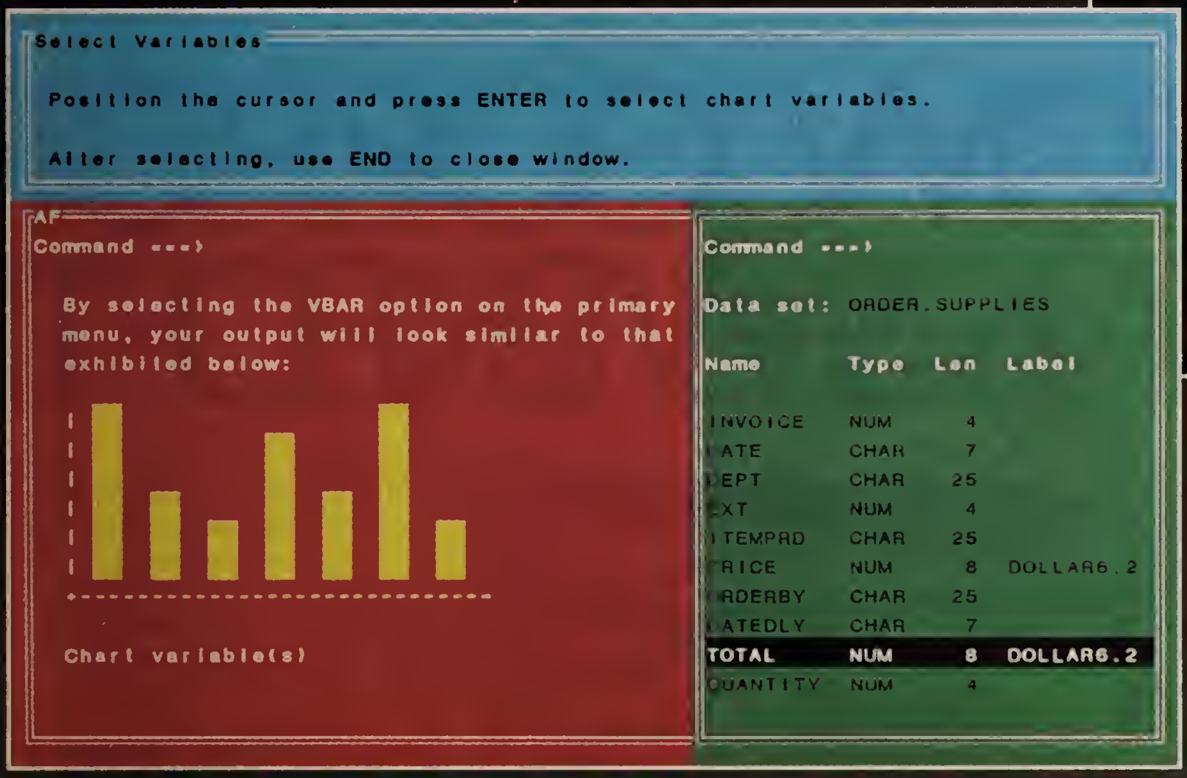

```
Select Variables

Position the cursor and press ENTER to select chart variables.

After selecting, use END to close window.
```

```
AF
Command ===>

By selecting the VBAR option on the primary
menu, your output will look similar to that
exhibited below:

Chart variable(s)
```

```
Command ===>

Data set: ORDER.SUPPLIES

Name       Type  Len  Label

INVOICE    NUM     4
ATE        CHAR    7
EPT        CHAR   25
XT         NUM     4
ITEMPRD    CHAR   25
RICE       NUM     8  DOLLAR6.2
RDERBY     CHAR   25
ATEDLY     CHAR    7
TOTAL      NUM     8  DOLLAR6.2
QUANTITY   NUM     4
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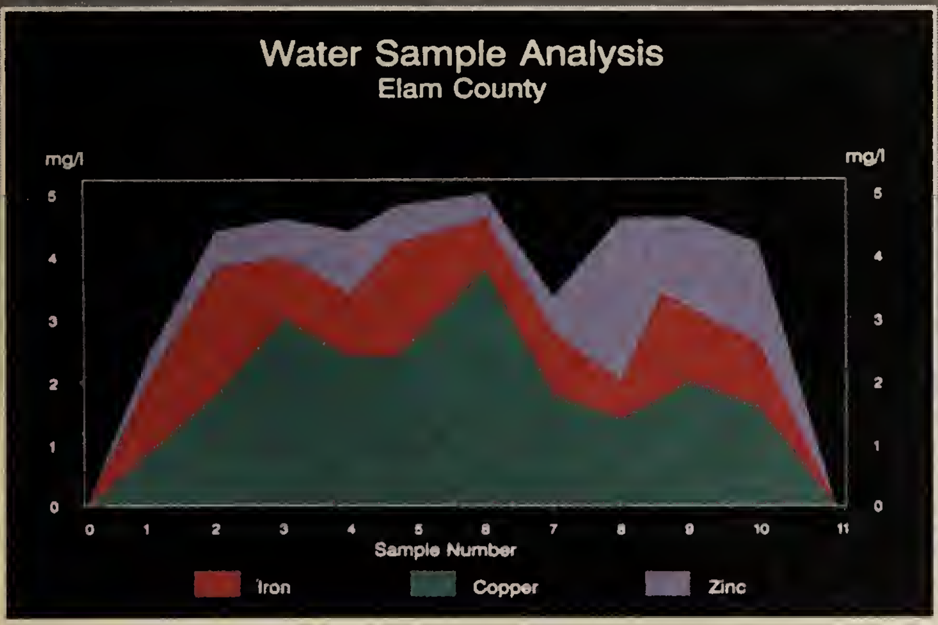

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Users want clones to keep IBM hungry

BY ALAN J. RYAN
CW STAFF

The dust has settled, been swept up and returned to form a new layer since IBM introduced its Micro Channel architecture and Personal System/2 to the world last spring. But users are apparently eager to see the dust stirred up again in the form of clones.

Users contacted in an informal survey last week said that if anything, the competition will help keep IBM's pricing reasonable. Yet the presence of compatibles in the marketplace does not guarantee sales.

Steve Wainwright, a project leader in charge of evaluating new equipment at Empire Blue Cross/Blue Shield in New York, said that although his company is basically an IBM shop, he will look at Micro Channel clones when they become available. Currently, he said his buying plans include PS/2 Model 60s and 80s, both Micro Channel products.

Build a better mousetrap

To attract a second glance from most shops, a clone must provide more than a comparable IBM machine, the users agreed.

The technology manager at a large chemical company said he would snub a Micro Channel-compatible machine offering strictly what IBM's computers offer, even though his company currently boasts a healthy mix of IBM and compatible personal computers. "A clone has to have something going for it other than that it copied IBM. All things being equal, why not buy IBM?" he asked.

Smaller shops, and those that have not traditionally been IBM in the past, routinely compare compatibles with IBM's offerings.

A data center worker at a Midwest insurance company said computers compatible with the Micro Channel-based PS/2 line will be looked at seriously, especially if end users express an interest in them. "Later this year, we'll be looking for a standard clone in this shop," she said. That clone will be either IBM Personal Computer AT or PS/2 compatible, she added.

Foremost for any clone to succeed would be its ability to properly run OS/2, the users agreed. All said their future plans include running OS/2 and applications written for it.

"We're heavily into mainframe communications, so we need the ability to run the Communications Manager" capabilities of OS/2 Extended Edition, Wainwright said.

A manager in charge of PCs for a Midwest manufacturing plant said the maker of the system is unimportant. "We're waiting for boards to make it a good system. If you don't have the function for it, it doesn't matter who made it," he said.

Meanwhile, the time frame for the first PS/2 clone sighting is narrowing. Rumors have surfaced that Tandy Corp. may show its own PS/2 Micro Channel-compatible computer sometime next month, and Kaypro Corp. has said it will be one of the first to have a compatible computer ready. But no one is talking about release dates.

"The first [PS/2 clone] has to appear, and everyone else will wait to see how IBM handles that," said Clare Fleig, director of research at International Technology Group in Los Altos, Calif. "It's a big risk for the first cloner."

Sun wraps X400 into E-mail plan

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. last week joined a small but growing band of major computer vendors that support the CCITT X.400 electronic messaging standard.

The workstation company introduced Sunlink Message Handling System (MHS), said to allow users on Sun's messaging systems to communicate with other X.400 standard systems.

Sunlink MHS runs on top of Sun's Sunlink OSI, so that it can be used for message exchange across a local-area network of Sun workstations, the vendor said. The product can also run on top of Sunlink X.25, for the transmission of messages over a long-distance packet-switching network.

A directory service is said to allow systems administrators to provide customized message routing over a complex system of networks that support both X.400 and Sun's proprietary messaging system, which adheres to U.S. Department of Defense protocols. The same set of addressing formats can be used to send messages to either type of system, according to Sun. The workstation vendor said it plans to enhance its X.400 product to support transmission of graphics, facsimiles and other types of information.

Sunlink MHS is scheduled for shipment in May at a list price of $6,000. Other computer vendors that offer X.400 products in the U.S. include Digital Equipment Corp., Hewlett-Packard Co. and Data General Corp.

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"Evaluating every graphics package available would have taken time and information center resources we couldn't spare. But we needed to know which package was right for us. And we needed to know fast."

Kevin Maloney, Senior Systems Analyst of Office Automation, Pepsi-Cola International (a division of PepsiCo, Inc.).

When Pepsi-Cola International turned to Corporate Software for answers, their needs were clear. The graphics packages they'd been using were no longer meeting their needs. They wanted a new generation—a more powerful product that could easily interface with their existing applications.

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Publishing load shifts to PCs

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — General-purpose computers grabbed some of the limelight usually reserved for traditional high-end publishing systems at last week's Seybold Seminars '88 on electronic publishing.

The annual show, held here, has generally featured proprietary, single-user publishing systems from companies such as Atex, Inc. Last week's conference, however, saw the high-end publishing industry begin to shift its focus to powerful 16- and 32-bit workstations that carry out advanced publishing tasks and give users more computing flexibility.

"We're going to see an industry built around proprietary technology rapidly moving en masse to PCs, Macintoshes and Unix workstations," said Jonathan Seybold, president of Seybold Seminars and Publications.

Users could reap the benefits

End users could have the most to gain from the industry changes. While a terminal that is tied into a proprietary publishing system restricts users to a limited number of tasks, intelligent personal computers can run anything from word processing programs to spreadsheet and data base applications.

"It's inevitable that users will prefer a general workstation that can do everything over a single-purpose computing system," said Bill Higgs, director of software research at Infocorp in Cupertino, Calif.

Apple Computer, Inc. was the most visible PC vendor trying to drum up support for its systems last week. Apple rounded up a gaggle of third-party developers to promote its Macintosh II as the hub of a multipurpose high-end publishing system that can be assembled with off-the-shelf commercial software. Third-party developers showing their wares on the Mac included Microsoft Corp., Aldus Corp., Cricket Software and Interleaf, Inc.

Sun Microsystems, Inc. attempted to firm up its position in the electronic publishing industry, promoting an open-system strategy based on its low-end Sun-3/350 and 3/360 workstations and a standard Unix operating system that can run across multiple platforms. A Sun official said workstation sales into the electronic publishing market already contribute as much as 10% to the company's total revenue.

Aldus and Digital Equipment Corp. built on their year-old marketing partnership, announcing plans for tighter integration between Aldus's PC Pagemaker and DEC's VAX servers and Decnet/OSI networks. DEC's VAX Integrated Publishing strategy calls for networked publishing systems that start on the desk top.

Unix windows do MS-DOS

MOUNTAIN VIEW, Calif. — Users of high-end engineering workstations and Unix-based multiuser systems need Lotus Development Corp. spreadsheets, too. At least that is the belief of Hunter Systems, which today plans to announce the availability of software said to allow Unix-based Motorola, Inc. 68020 machines to run unmodified Microsoft Corp. MS-DOS software.

The package, called XDOS, works with systems such as the NCR Corp. Tower and Sun Microsystems, Inc. Sun-3/160. Hunter officials claimed the software also allows the Unix-based machines to run multiple MS-DOS programs simultaneously in Unix windows. Personal computer programs reportedly can address volumes on a hard disk that exceed the 32M-byte limit of MS-DOS.

Hunter claimed that XDOS technology will ultimately allow any non-MS-DOS computer to run MS-DOS. The software is currently being enhanced to work with reduced instruction set computers.

Hunter said XDOS uses binary compiler technology, which provides higher software performance than other simulators. Instead of using the C, assembler or Pascal source code of MS-DOS, the code is converted into an executable binary file. When the binary file is combined with XDOS emulation of MS-DOS, MS-DOS can run on a variety of architectures.

XDOS is available for low-end systems for $425, mid-range systems for $1,000 and high-end systems for $2,000.

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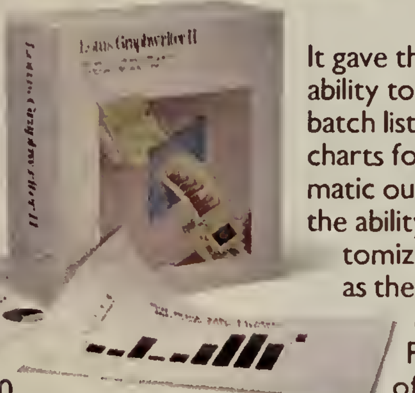

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Users put ONA plans on back burner

Wary firms ponder standard's puzzle and promise, await FCC ruling on Bells' tolls

BY KATHY CHIN LEONG
CW STAFF

Now that all seven regional Bell holding companies have filed their Open Network Architecture (ONA) plans, users groups and industry experts are urging businesses to start figuring out — and planning for — ONA's future impact on their voice and data networks.

But while effects of ONA will impact both voice and data networks in terms of billing, services and sheer number of vendors, many companies are putting the topic on the back burner until the Federal Communications Commission formally approves the plans of the seven Bell holding companies sometime this fall.

ONA represents an FCC edict that the divested Bell operating companies provide their customers with consistent, fairly priced access to the Basic Service Elements (BSE) that provide access to, and transportation across, the local carrier's network.

Customers in this context are both business users and enhanced service providers, such as value-added network or electronic-mail vendors. The idea is to ensure that if the operating companies start offering enhanced services such as voice-mail or electronic data interchange, they do not use their control of local access lines to shut out their competitors.

Some companies are relying on the representation of users groups such as the Ad Hoc Telecommunications Committee, the International Communications Association and the Committee of Corporate Telecommunications Users to see to their ONA interests in Washington, D.C.

However, corporations such as The Travelers Corp., Atlantic Richfield Co. (Arco) and Visa International, Inc. have dedicated staff monitoring the issue.

Seeking continuity

For Arco, a major objective with ONA is "continuity between the Bell companies in their services," stressed Don Walton, manager of operatoins and support at Arco in Los Angeles. Large national companies like Arco hope that ONA will make possible the same basic features at more-or-less consistent prices from all of the divested Bell operating companies.

Walton's second big concern is that the quality of service improves rather than degenerates under ONA. "ONA can be good for users, since it will offer options never given to us before, but I want to be sure that Arco is going to be much better off."

Other users said they are concerned about who is going to foot the bill for the carriers' early, and possibly unprofitable, attempts at ONA-based services.

> "IN A FEW years, you won't have any choice but to select ONA services if you want to be competitive. . . . That is just how things are headed."
>
> KENNETH PHILLIPS
> COMMITTEE OF CORPORATE TELECOMMUNICATIONS USERS

Companies that have a major stake in data networks are impatient to get some solid, stable specifications so that they can make sure their equipment is compatible with ONA services.

'Big burden'

"This is going to be a big burden for us," said Leland Fong, senior network planner at Visa. "For a company such as ourselves, it is hard to understand and determine what the engineering or design of our networks must be."

That concern is understandable, ONA trackers sympathize. The complexities of ONA baffle even the sharpest of telecommunications analysts; there are reams of documents on the issue.

And the BSEs range from basic packet-switching offerings to call-detail recording. While regional Bell holding company Ameritech filed for 21 BSEs, counterpart Nynex Corp. filed for as many as 91.

Some users have been frustrated in their attempts to understand ONA's technical — and possibly political — ramifications for their companies. "They feel as though they have been left out of the planning process," said Kenneth Phillips, vice-president of telecom policy for the Committee of Corporate Telecommunications Users. The Bell companies have hosted individual sessions to outline their ONA strategies. "They were good attempts, but instead of having users participate, they were sessions that mainly told users what to expect," Phillips charged.

"If users were confused about ISDN, they are certainly unclear about ONA," said Tom Nolle, president of Cimi Corp., a

Continued on following page

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   - **70.** Mining/Construction/Petroleum/Refining/Agric.
   - **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
   - **85.** Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - **90.** Computer/Peripheral Dealer/Distributor/Retailer
   - **75.** User Other ______________________
   - **95.** Vendor Other ______________________

   (Please specify)

2. **TITLE/FUNCTION** (Circle one)

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   - **23.** Dir., Mgr., Suprv., Analyst, of Systems
   - **31.** Dir., Mgr., Suprv., of Programming
   - **32.** Programmer, Methods Analyst
   - **35.** Dir., Mgr., Suprv., OA/WP
   - **38.** Data Comm. Network/Systems Mgt

   OTHER COMPANY MANAGEMENT
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   - **12.** Vice President/Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt.
   - **51.** Sales/Mktg. Mgt.

   OTHER PROFESSIONALS
   - **60.** Consulting Mgt
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educators, Journalists, Librarians, Students
   - **90.** Others ______________________

   (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
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   - **B.** Minicomputers/Small Business Computers
   - **C.** Microcomputers/Desktops
   - **D.** Communications Systems
   - **E.** Office Automation Systems
   - **F.** No Computer Involvement

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Lotus's Metro squeezed for expanded PCs

CAMBRIDGE, Mass. — A new version of Metro, a desktop management package, began to ship last week from Lotus Development Corp.

The package, which butts heads in the market with Borland International's immensely popular Sidekick, now supports the IBM Video Graphics Array standard and uses less random-access memory. The original version of Metro squeezed users' work space by chewing up 120K to 140K bytes of RAM. The newest version uses only 64K bytes by "swapping out" unused modules, according to the vendor.

However, in order to use the memory-swapping features, customers must have a hard disk or Intel Corp.'s Above Board. Without these, Metro still requires 125K bytes of RAM.

Metro 1.1. also supports IBM's Personal System/2 line of computers and other 3½-in. floppy disk drive-based machines.

Metro still costs $85, and registered owners can upgrade for $35. In addition, users of Lotus Express, a communications package that works with MCI Telecommunications Corp.'s MCI Mail, can also upgrade for $35.

ONA

FROM PRECEDING PAGE

Haddonfield, N.J.-based consultancy. According to Nolle, ONA remains a set of established policies that affect users indirectly. The third-party network vendors, known as enhanced service providers or ESPs, are involved in future product planning. But until something actually materializes on the market, most users said they prefer to wait.

Watch, look and listen

"I'm not involved in any committees or anything; I prefer to wait and see how it will all come together," said Gary Ho, manager of data communications at Transamerica Corp. in Los Angeles.

But ONA pundits are anxious for users to take a more active role. In five years, the voice and data networks will be radically changed, Phillips stressed. He noted that the telephone companies are backing ONA as a precursor to Integrated Services Digital Network. "In a few years, you won't have any choice but to select ONA services if you want to be competitive in the marketplace. That is just how things are headed."

Consultants, including Nolle, have urged users to stay on top, as much as possible, of ONA proceedings. Next month, users and vendors will have an opportunity to issue their comments to the FCC on the Bell company filings. "Users must demand that their phone companies tell them what this all means," Nolle said. "In the 1990s, the telecom world will be vastly different. Users will be able to tap into the central office switch data base and obtain their own voice services. But this all leads into the issue of what to do and when to do it."

Metaphor hopes Nielsen data deal boosts ratings

BY J. A. SAVAGE
CW STAFF

Users of Metaphor Computer Systems, Inc. minicomputer-based management information retrieval systems will not have to wait for the mail to bring them data from Nielsen Marketing Research, a division of A. C. Nielsen Co.

An alliance announced last week between the two companies to design and market proprietary information delivery promised that users will be able to tie directly into Nielsen's data base server by early next year.

The bulk of Metaphor users are in the packaged goods area — those who manufacture what is available on supermarket shelves.

Data's in the mail

And according to Nielsen, most packaged goods manufacturers subscribe to its research services. Currently, data tapes from Northbrook, Ill.-based Nielsen are available by mail.

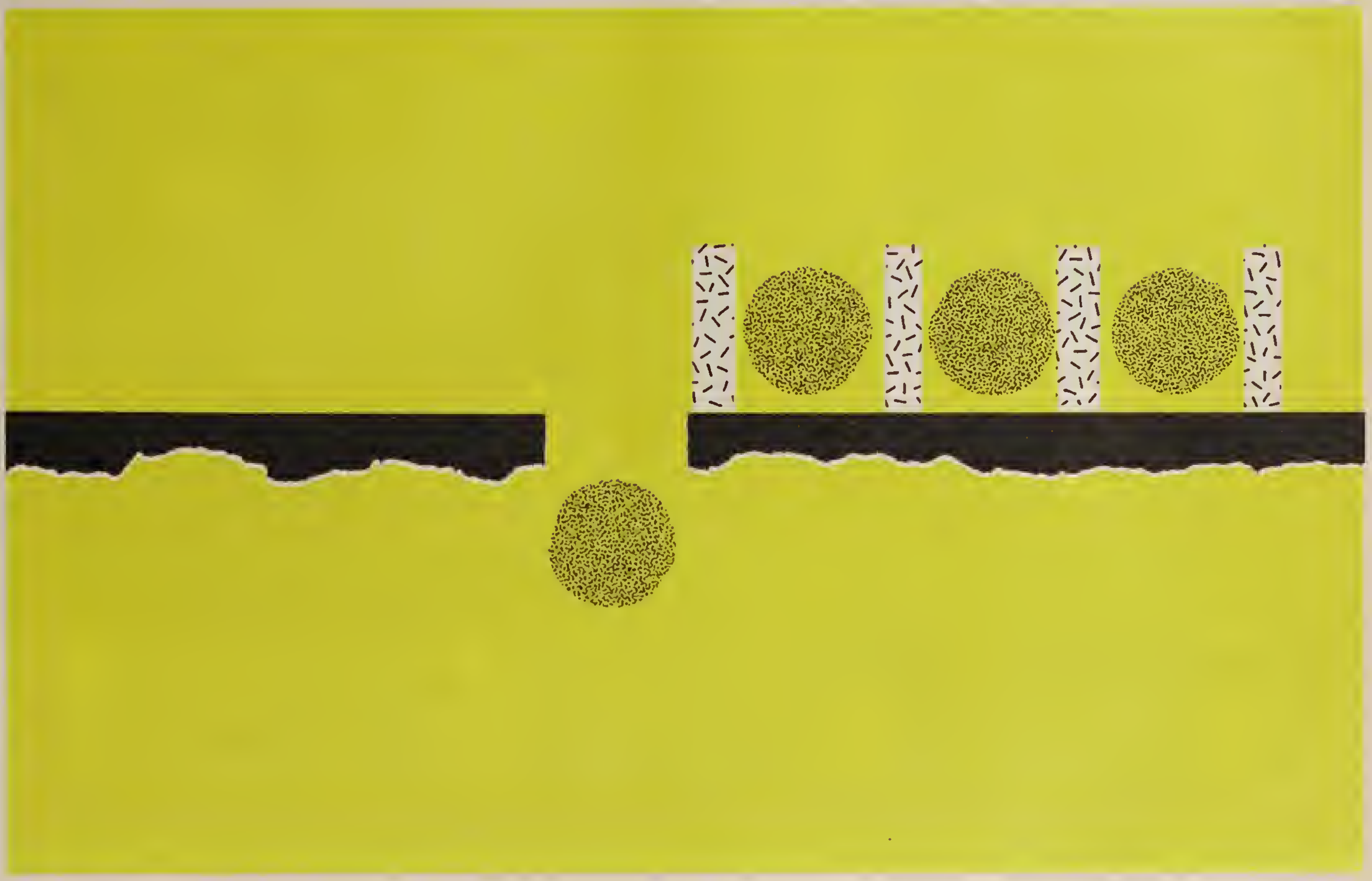
According to the company, a basic configuration of DBS-250 — a relational data base server, a data base gateway, a file server, a communications server, workstations and software tools — costs about $300,000.

A Nielsen spokesman commented that for many users, it would not be unusual to spend that much again on marketing information services.

Proctor and Gamble Co., for instance — the consumer goods firm that is currently Metaphor's biggest customer — "spends $2 million to $3 million on Nielsen's [data]," according to Metaphor President Don Massaro.

No price has yet been set for direct access to Nielsen's data.

Nielsen marketing information will also be available to IBM Personal Computer-compatible systems, according to both companies.



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DG to resell Bridge LAN-based links

BY ELISABETH HORWITT
CW STAFF

WESTBORO, Mass. — Continuing down the migration path to a standardized local-area networking architecture, Data General Corp. last week revealed plans to resell two Bridge Communications, Inc. products that provide LAN-based links between its terminals and hosts.

The announcement reflects a closer working relationship between DG and Bridge, noted DG product manager Todd Kurland. The original marketing agreement, announced last summer, called for DG to bring Bridge sales agents in on any pending deal in which Bridge's 802.3 networking products seemed approriate, Kurland said.

DG decided, however, to sell certain Bridge products as integral parts of its own networking line. This will boost DG's strategy of migrating its networking line to the International Standards Organization's Open Systems Interconnect (OSI) networking standard, since Bridge is also headed that way, Kurland said. "We will implement any OSI enhancements they introduce."

Talking it up

A similar agreement between DG and 3Com Corp. is "in the talking stages," Kurland said. By linking its own systems to 3Com's products, DG would provide its customers with enhanced connections to IBM Personal Computers, he added.

DG will initially resell Bridge's Communications Server/200 (CS/200) and Network Control Server/AT (NCS/AT) "because they address about 90% of our users' networking requirements," Kurland said. "Customers aren't asking to migrate [to a Bridge LAN] from an existing direct terminal-to-host connection, but we've had a lot of requests from companies that are moving into new buildings." While LAN-based links cost more than a direct connection, they ease communications between large numbers of terminals and multiple hosts, Kurland said.

The two companies also will work together to develop new products and enhance existing ones specifically for DG systems, Kurland said. And DG would like to develop with Bridge a direct Ethernet host link that would be more economical than the current CS/200 connection.

DG's relationship with Bridge enables the minicomputer vendor to catch up with Digital Equipment Corp., which has been offering LAN-based terminal-to-host connections for years, according to David Passmore, a principal at Fairfax, Va., research company Network Strategies, Inc. Such links "are a useful alternative to running gobs of twisted-pair wire to connect terminals to hosts," he added.

Integrating 3Com's line of PC LAN hardware and software could prove more difficult for DG, however, Passmore said. "3Com and Bridge haven't integrated their own products yet, but maybe Bridge could eventually provide bridges between 3Com servers and DG hosts."

The CS/200 provides concurrent access to an Ethernet LAN for up to 10 asynchronous hosts and workstations at speeds of 19.2K bit/sec. per port. The DG version, Termserver, is priced at $3,650. The NCS/AT, to be sold by DG as Termmanager, is an IBM PC-based system that monitors and controls network traffic on up to 128 Termservers. It can reconfigure Termserver ports, maintain audit trails of network errors and monitor and control user access to the network.

DG said it will sell a Termmanager system, running on a DG Dasher/286 PC, at a base price of $12,160.

Teradata adds Sun, IBM tools

LOS ANGELES — Teradata Corp. last week reached out to other computing environments by extending its IBM SQL support and announcing an interface to the Sun Microsystems, Inc. platform.

The company said its Transparency series will provide users of its data base machine, the DBC/1012, with the ability to process SQL requests from applications that have be written to work with IBM's SQL/DS or DB2.

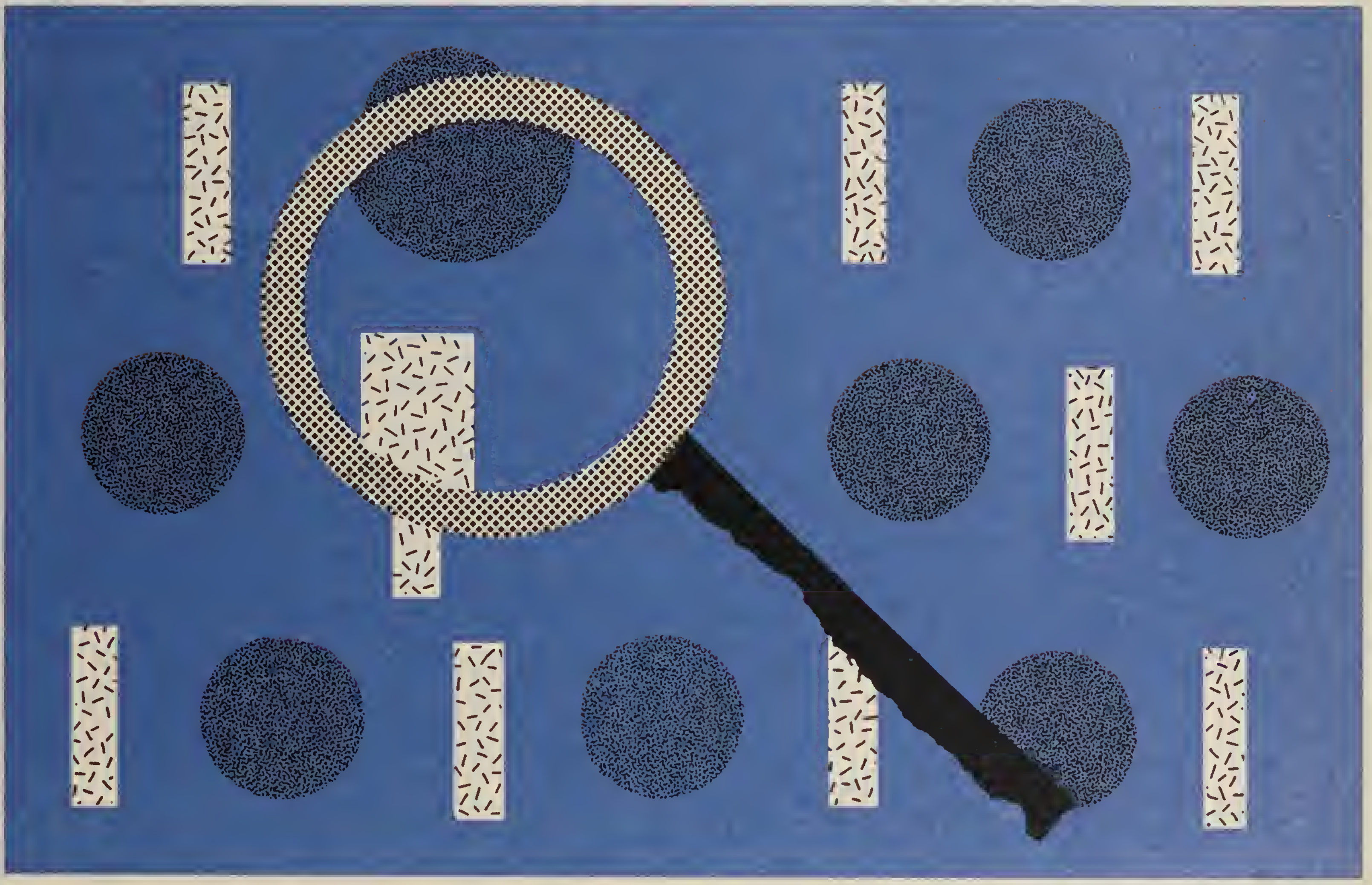
The software will be introduced in phases, the company said. An initial release supporting SQL/DS will be available next month and offer support for three applications, including IBM's QMF and SAS Institute, Inc's. SAS system.

DB2 support for the Transparency series is slated for introduction in June, the company said.

The Transparency series will carry a license charge of $25,000, Teradata said.

The Sun interface is said to provide direct access across an Ethernet network so that a Sun workstation can communicate with a DBC/1012 as a peer. Previously, DBC/1012 users were able to connect various workstations that would function as a terminal in a slave mode to the host data base machine.

The software is scheduled for release in July and will be licensed for $4,000, the company added.



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EDITORIAL

Get real

If you think it's odd that U.S. semiconductor makers are now pressing the U.S. government to ensure Japanese manufacturers supply high-capacity memory chips to our markets, you're right.

This is the same group that pressed for, and won, sanctions against Japanese producers. Now, there are mounting shortages of 1M-bit dynamic random-access memory chips, shortages that are causing delays in some computer products getting to market. Are the Japanese playing hardball by holding shipments down, or were the sanctions just a stupid idea?

The idea behind them was to encourage greater investment by U.S. firms. Instead, the price for dynamic RAMs eventually skyrocketed. If this sounds similar to the situation in the auto industry a few years ago, where profits of U.S. auto makers soared following the Japanese acceptance of voluntary quotas, you're right again.

No one argues that some Japanese companies were dumping memory chips into slack markets. Whether that was a clearance sale because of market conditions or a concerted effort to monopolize the chip market has never been shown.

Whatever the case, U.S. chip makers had better learn to play ball in an international league. This cry-baby bellyaching is not going to win a lot of support, especially when the end result is artificially strengthening the hand of IBM, which is big enough to sculpt its own dynamic RAMs.

James F. Benton

There were sheriffs and frontier judges in some towns of the Old West who relied not on might but on craftiness to keep the peace. There were so many bad guys, so many internecine feuds, that the best weapon these men had against the general rancor of the times was not a gun but guile.

Similarly was Jim Benton a modern-day peacemaker. He fought to solidify the delicate union he helped create — a union that at times threatened to fly apart under the force of internal turmoil — while using the strength of that union to fight bigger battles. Benton, the leader of the Computer Dealers and Lessors Association, died last week at the age of 57 (see story page 79).

Under his leadership, the CDLA weathered tremendous storms. Twice, the reputation of the lessors was rocked to the core, first by the Itel disaster, then by the OPM scandal. The dealers and lessors themselves competed ferociously with one another. At times, the competition turned cutthroat, aggravated by, among other things, IBM's bold push onto the leasing scene four years ago with IBM Credit Corp.

Through all this, Benton wined and dined and wheeled and dealed his way through Washington, D.C., lobbying — usually successfully — on behalf of his group.

Like the CDLA, Benton was one of a kind.

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LETTERS TO THE EDITOR

Behind the scenes

As one of the officers in charge of the investigation in the Detroit income tax case, I was disappointed in the information provided regarding our investigation, reported in "To catch a thief: Lessons in systems security" [CW, Dec. 14, 1987].

I am particularly sensitive to media coverage of Detroit police investigations that give the impression, direct or implied, that any one investigator solved a case. Those of us in law enforcement know that very few fall within that category.

The income tax case was a difficult, complex and lengthy investigation. It required many days of document review and meetings with Detroit income tax management personnel and systems analysts. It required instruction on the use of slave terminals until we understood how Ronald Cojoe manipulated the data to accomplish his criminal act and required the review of thousands of canceled checks to locate the evidence needed for prosecution. It required the design of forms that matched hard copies of data base information with canceled checks and other evidence documents in order to track the fraudulently produced refund checks from alteration of data bases through the actual cashings of checks.

All of this had to be accomplished while working undercover to avoid revealing our efforts to Cojoe, who was still functioning in a position of authority.

Through the combined efforts of Sgt. James Arthurs, Investigator Marvin Winkler, Lt. Fred Campbell, Assistant Prosecutor Nancy Alberts and myself, all four defendants pleaded guilty rather than stand trial. It should also be noted that they were not prosecuted under racketeering statutes, as your story indicated. They were, however, charged under Michigan statutes covering embezzlement and obtaining money under false pretenses. Since this conviction, the City of Detroit has filed suit in federal court in an attempt to recover the stolen funds.

Charles S. McEwen
Sergeant
Criminal Investigation
Bureau Staff
Department of Police
Detroit

This week in history

March 13, 1978
The appearance of a series of IBM demonstration centers for the firm's new 5110 system sparks speculation that the company is testing the feasibility of opening a retail chain to distribute its small business systems. IBM denies it is considering such a change, stressing that it has operated demonstration centers for other systems.

March 14, 1983
The Federal Communications Commission releases an access charge reimbursement plan that will force telecommunications users to pay their local telephone companies more to handle message toll service and WATS calls, beginning Jan. 1, 1984.

Under this new scheme, local phone companies will bill users directly for access charges.

Still struggling

In the article "MIS dream jobs still elude blacks" [CW, Jan. 18], you pointed out the underrepresentation of blacks and Hispanics in MIS management jobs. But according to your pie chart, only 1.5% of MIS managers are Asian.

Asian Americans are 2% of the population and 4% of all professionals. Yet they have failed to make a proportional impact on MIS management. This pattern is repeated in many other professional fields in which Asians do fairly well as individual contributors but are often not promoted into management. Please remember that Asians are also a minority. Though Asian Americans have scored many successes in the computer field, they remain far from even as far as management is concerned.

Arthur Hu
Lead Engineer
Mosaic Software, Inc.
Stoneham, Mass.

Prolific Ethernet

In "Reality falls short of hopes" [CW, Jan. 25], I was quoted as estimating that the installed number of token-ring local-area networks in 1990 will be 50% of the total LANs worldwide.

What I gave were estimates for worldwide shipments of token-ring networks by U.S. vendors by 1990, not the installed

Continued on page 23

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

AI stars falling, but sky still bright

Although big names are taking over the territory, pioneering spirit isn't dead

HARVEY NEWQUIST

The way you can tell the pioneers from the followers in any business, the saying goes, is that the pioneers always have the arrows in their backs. Sometimes they're even unlucky enough to be lying face down in the mud.

As certain artificial intelligence companies report losses and slowing sales, people are saying, "AI must be dead." The truth is that commercial users have never shown as much interest in the whole field of AI as they do today.

Granted, some of the pioneers, such as Symbolics, Intellicorp and Teknowledge, are taking heavy beatings in sales and profits. But at the same time, Sun Microsystems, Apple and even IBM are focusing on AI, especially expert systems, as an area that's financially worth exploring.

History repeats itself

Remember when intrepid PC start-ups like Osborne, Corona and Eagle started backsliding after Compaq, IBM and the imported clones swept up the market? The PC industry did not go down with those failing companies. In fact, it consolidated. The new companies validated the business of manufacturing and selling PCs.

Symbolics invented the market for hardware that ran expert system software back in 1980. After about six years, the bigger kids on the technology block saw what a nice little business this was and got into the act.

First, DEC positioned its VAX workstations as worthwhile for performing AI tasks. Then, upstarts Apollo and Sun started offering low-cost alternatives to LISP machines. In the last six months, IBM has been touting everything from its joint marketing agreements with Intellicorp to its own Knowledgetool package to a new architecture that will allow for expert system porting to IBM environments.

The price is right

On the other hand, the new darling of corporate microcomputing, Apple, has teamed up with the U.S. darling of semiconductor manufacturing, Texas Instruments, to bring a whole new piece of AI architecture into play.

TI is going to be putting its Lisp Megachip into Apple's Macintosh IIs to create a machine to perform AI tasks for just under $20,000.

The typical Symbolics machine costs four to five times that much, banking that you will pay for the increased power and efficiency. Apple and TI are making AI accessible to the less power-hungry mass market with their $20,000 machine.

In AI, the mass market is where the action — and the money — is.

Off to a great start

Most of the AI companies formed in the early '80s based their products on such radical technologies that they touted being on the leadingest and bleedingest edge of computing. They sat back and just waited for customers to beat a path to their doors.

HAL MAYFORTH

At first, this strategy worked. All the branches of the military — prompted by the Defense Advanced Research Projects Agency and various research labs like Lawrence Livermore, Sandia, SRI International and Los Alamos — lined up to buy the products as soon as they came off the vendors' docks. Price was no obstacle.

Corporate America was a little bit slower to catch on. Companies like General Motors, Boeing and Westinghouse jumped at the chance to get into AI technology and, in some cases, even bought equity stakes in the fledgling pioneers.

But they were the exception; most companies started finding out about expert systems through magazine articles and an occasional seminar at a computer conference, not through product purchases.

Despite the fact that most AI products couldn't be integrated with existing installed hardware and software, the AI pioneers still grew at incredible rates through the mid-1980s, many increasing sales by more than 50% per year.

After the flood

Then the well began to run dry. Almost all of the research groups that either needed or wanted high-powered and high-priced AI products had them by the end of 1986. The rest of the potential customers were still in learning, not spending, stages. Those that were ready to spend weren't ready to spend thousands of dollars on stand-alone and nonintegratable technologies.

The AI vendors had already anticipated a massive influx of cash from the mass market and bought bigger headquarters buildings and added staff. Some of the pure AI companies became too bloated to tread water in 1987 and began to sink.

Conversely, corporate America was finding that AI really did provide solutions to problems that could not be solved via regular software. Companies like Fireman's Fund, American Express, Chemical Bank, Coopers & Lybrand and Du Pont started publicizing their success using and jointly developing AI applications.

Other, smaller, companies, hearing of these endeavors, started picking up AI products — especially those designed for PCs — in droves, while the large-system AI vendors watched their own sales suffer. So as user interest was on the incline, some AI vendors were already on the decline.

Savvy marketing on the part of mainstream computer companies helped push the AI vendors further off kilter. IBM and Cullinet both offered AI products as adjuncts to their existing product lines, selling AI not as a special tool but as a peripheral that could be added to existing systems.

That was just what the cus-

Continued on page 23

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

Start planning now for multiprocessors

EFREM MALLACH

Fad followers who chase each passing bandwagon land by the wayside. Those who understand the underlying technological and economic factors behind trends wait for the right bandwagon to come along and are firmly seated as it moves forward.

In terms of processor architecture, which path should you follow? You must make these choices:

- Microprocessors or minicomputer/mainframe processors constructed out of many components?
- Special-purpose or general-purpose designs?
- One processor or many?

The fundamental technological and economic forces tell us that microprocessors are inherently more cost-effective than any other approach. That is because they utilize the potential of any technology to its fullest. Every gate on an Intel 80386 helps make it the best possible 386 microprocessor.

By contrast, a more widely useful component, such as a bit slice, cannot be fully utilized in a specific application. The need to interconnect such chips, and the components that make these connections possible, further handicap a system not based on microprocessor technology.

Will only get better

Not only are microprocessors the most cost-effective approach today, their edge must inherently grow with time. Chip complexity increases each year as designers learn how to make components smaller and the chips themselves larger. In a microprocessor, each added gate does its share. Were this not so, a different gate would have been put there in its stead.

Conversely, designers of generalized components put the most-used features in first. Capabilities added later — such as the seventh and eighth inputs to a NOT-OR, or NOR, gate — are of lower value and will tend to contribute less to the eventual system.

For these reasons, microprocessor performance is rising faster than that of minis or mainframes. From 1982 to early 1988, the speed of the fastest widely used microprocessor increased by a factor of six, from 0.5 million instructions per second (MIPS) on the Motorola 68000 to 3 MIPS on the Intel 386. Mini performance rose from 3 MIPS on the Data General MV/10000 to 12 MIPS on the Prime 6530, a fourfold increase. Mainframes climbed from 8 MIPS on an IBM 3081 with a single CPU to 20 MIPS on an Amdahl 5890, a factor of 2½. MIPS are a poor measure, but the trends are clear.

The second factor to consider is that general-purpose processors are more cost-effective than those optimized for a particular application. It is easy to design a special-purpose architecture that looks better on paper. Start with a general-purpose design and take out any instructions, registers or other parts the application doesn't use.

USERS and vendors who prepare for using multiprocessor architectures based on general-purpose microprocessors will have the most cost-effective systems in five years.

But the specialized design will cost more because of lower production volume. Most experts figure a 20% drop in unit cost each time volume doubles. The economic logic in favor of general-purpose processors eventually overwhelms the engineering logic that favors a specialized design.

The general-purpose architecture edge will increase with time. Here, the gap is widening because research and development accounts for a growing fraction of chip cost.

When volume doubles, the R&D allocated to each chip produced drops by 50%. Simple special-purpose devices may hold out against a 20% production learning curve for a while, but complex ones can't fight a figure that approaches 50% when R&D becomes a major factor in the computation.

To draw conclusions from these two trends, we must take a third fact into account: A single micro can't do it all. Early this year, there was still roughly a fourfold gap between the speeds of the fastest micro and the fast-

Continued on page 23

Mallach is a faculty member of the Boston College School of Management and a consultant to user and vendor executives. Based in Needham, Mass., he recently published *Win Them Over: A Survival Guide for Corporate Consultant Relations Programs.*

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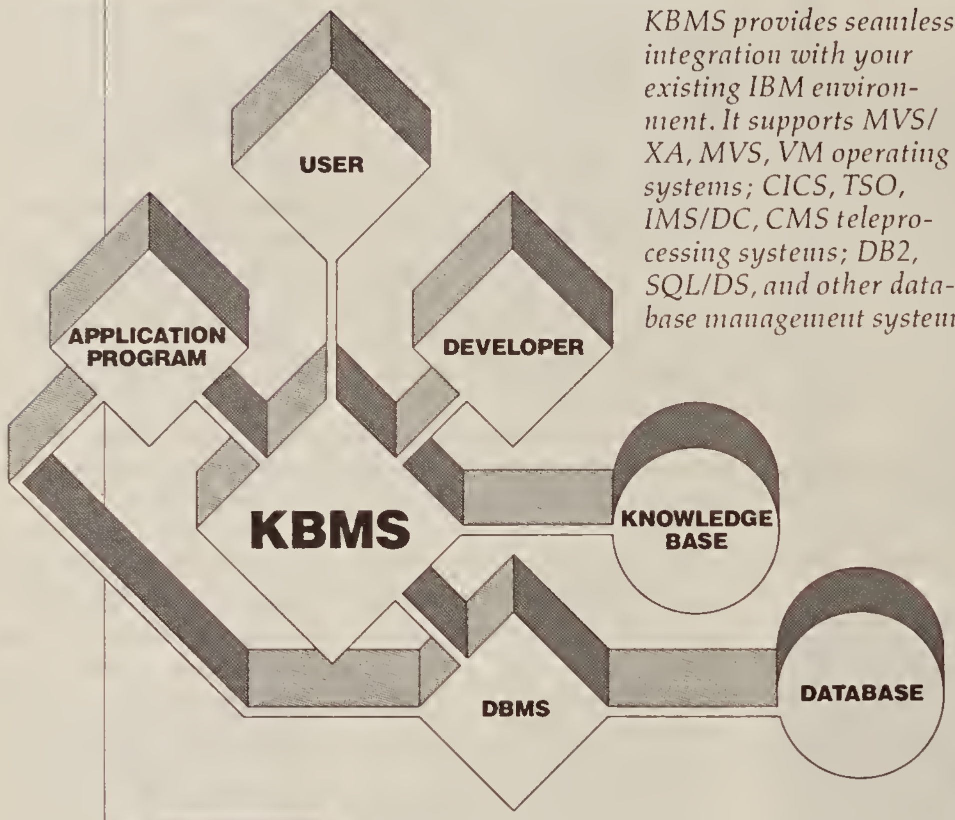

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Multiprocessors

CONTINUED FROM PAGE 21

est mini and a sevenfold gap between the fastest micro and the fastest mainframe.

It takes 27 Intel 386s to match the raw power of an Amdahl four-processor complex. The conclusion is inescapable: The most cost-effective way to obtain substantial processing power is turning out to be a multiprocessor architecture utilizing general-purpose microprocessors.

Cost-effective does not mean suitable for all applications. There are some application areas in which massive power is applied to a single task. Apollo's recently announced Domain Series 10000 Personal Supercomputer, and similar ones from Stellar, Ardent and others, bring mini-super price/performance standards to the desk top.

This aggressive pricing reflects competition in the workstation market as much as inherent cost factors. Their price per MIPS is impressive, largely because workstations tend to have less I/O bandwidth and tend to be configured with less memory, fewer peripherals and fewer ports than commercial systems offer.

Yet in aggregate throughput per dollar and correcting for configuration differences, these systems barely approach the multimicroprocessors from Sequent, Encore and their cousins. And the Sequent- and Encore-type machines have been here for two years. In the high-tech computer business, that's a full generation of technology. Next year's multi-68030 products, and the 1990s' multi-80486 systems, should be even better.

If you don't need it, don't get it

The bottom line: If an application doesn't require the absolute maximum single-task performance, systems designed with that factor uppermost in mind are poor choices.

What about reduced instruction set computing? RISC is a fine way to design instruction sets. Its advantages apply to general-purpose micros as much as to anything else. There are several commercial microprocessor RISC projects under way. If the world converts to RISC, the fundamental forces and trends will still apply. The long-run relationships among micros, minis and mainframes will not change. All three will stabilize at a new level on account of the benefits of RISC but in the same relative positions.

People who fear their skills losing value in a new environment will fight changes tooth and nail. The costs of peripherals, memory, software and support, all of them unaffected by processor technology, blunt the system price impact of pure CPU cost-effectiveness. Also, new products do not yet have the system and application software depth that mainframe and mini families have amassed.

The long-range trend is clear: Users and vendors who prepare for using multiprocessor architectures based on general-purpose microprocessors will have the most cost-effective systems in five years.

AI stars

CONTINUED FROM PAGE 21

tomer wanted to hear: He didn't have to start over if he wanted to get into AI, and these products would work with the millions of dollars worth of hardware and software already installed in his computing center.

Fight for survival

Now the AI pioneers are playing catch-up. Some, such as Lisp Machines and Silogic, have already fallen by the wayside, while some are headed in that direction.

Many of these firms are rushing to get their products into the mainstream. Inference Corp. is putting its expert system product on IBM mainframes, while Intellicorp is readying an Intel 80386-based version of its expert system for market. Aion and Neuron Data already offer their products in environments ranging from the VAX to the Mac.

But don't rule the pioneers out yet. They invented artificial intelligence products in the first place and took them to the point where the IBMs, DECs and Suns of the world saw a reason to jump into the action.

A few AI shooting stars doesn't mean the whole sky is falling.

Prolific Ethernet

CONTINUED FROM PAGE 20

base number.

The IEEE 802.3 Ethernet technology has been and continues to be quite prolific. It is a technology that is not only well understood by the user and vendor communities but also continues to remain the primary LAN technology of several prominent communications and systems providers throughout the world.

In certain environments, 802.5 token-ring has made significant inroads into this established marketplace, and the inherent advantages of that architecture will continue to supplant Ethernet in years to come.

Today, the European community is already witnessing an increase in the sales of token-ring vs. Ethernet, but we are a good decade away from token-ring's installed base surpassing that of Ethernet's, if, in fact, that ever happens.

Douglas Gold
Senior Research Analyst
Local-Area Network Market
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SOFTWARE & SERVICES

SOFT TALK

Jerrold M. Grochow

A CASE for integration

Let's face it: We live in a multivendor world for software design and development tools, and we have to figure out how to survive in that world.

Since vendors don't provide generalized interfaces to other vendors' tools, the burden falls in our laps, the users of these tools, to create our own integrated computer-aided software engineering (CASE) environments.

While some vendors claim to provide integrated CASE environments, they typically only deal with a portion of the life cycle or with a specific development methodology. This means that users still need to combine several vendors' tools to create the desired CASE environment.

Since the benefits of using a CASE environment often come from the ability to automatically pass information from tool to tool and, therefore, from one life cycle phase to another, the need for integration is clear. The issue is how to do it best without spending a fortune and with some hope of a lasting solution.

Continued on page 26

MVS/ESA widens OS options

But IBM's PR/SM partitioning scheme unlikely to sway VM users

BY ROSEMARY HAMILTON
CW STAFF

RYE BROOK, N.Y. — With the recent announcement of MVS/ESA, IBM has made available for the first time the ability to run multiple operating systems without VM.

It seems unlikely, however, that large numbers of VM operating system users will abandon VM for the IBM 3090E Processor Resource/Systems Manager (PR/SM) feature. PR/SM is the hardware option that creates a multiple operating system environment for MVS/ESA.

The ability to manage multiple operating systems has long been a job exclusive to VM in large MIS shops. Prior to PR/SM, the only other way to support multiple operating systems was the physical partitioning of IBM's multiprocessor systems such as the 3090 Model 400.

Limited application

According to Bill Wilson, IBM's group director for large systems, PR/SM is intended only for those shops that have no other VM requirements, such as the use of the CMS teleprocessing monitor. In addition, Wilson said, VM has built-in tools that assist a user in a migration or testing environment that would not be provided with PR/SM.

"PR/SM makes a whole lot of sense if you strictly want to carve up your CPU," said Tom Foth, a senior software developer at VM Personal Computer, Inc. in Danbury, Conn.

Wilson said IBM is trying to provide more options for large shops rather than discourage the use of VM.

Currently, approximately 50% of all MVS shops also run VM, according to Wilson. Of that 50%, Wilson estimated that several hundred use VM strictly to guest other operating systems or to run a test version of a new operating system release.

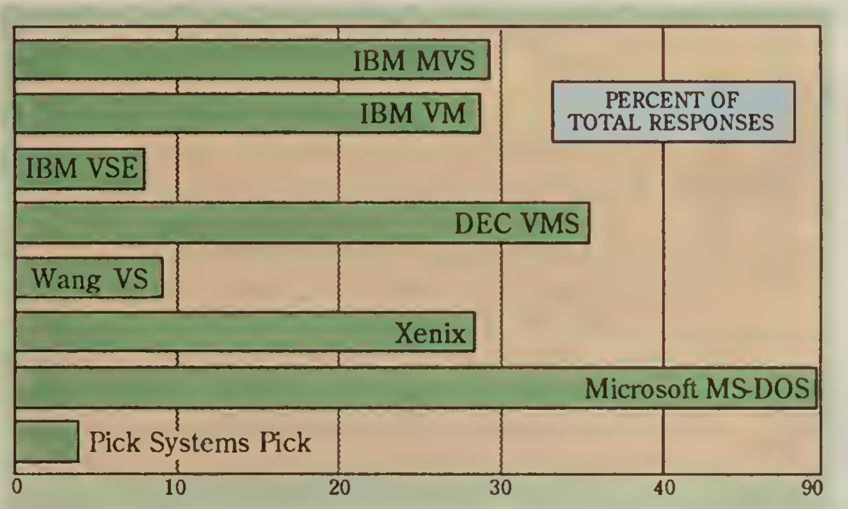
"There should be a number of people who will justify PR/SM — those who don't want to

Continued on page 29

Data View

Used alongside Unix

Other operating systems cited by 135 Uniforum 1988 attendees in Dallas as being used with their Unix systems



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CW CHART

Cameo offers data capture

BY NELL MARGOLIS
CW STAFF

SANTA CLARA, Calif.— Managers charged with quality control responsibilities in manufacturing plants are the main target users for Cameo Systems, Inc.'s new data analysis software for three major lines of minicomputers and the IBM Personal Computer AT.

Dubbed Camstat, the software consists of an integrated set of statistical functions said to allow technicians to capture

Continued on page 26

Accounting series for VAX aired

BY ALAN ALPER
CW STAFF

GARDEN CITY, N.Y. — Computer Associates International, Inc. last week unveiled an integrated accounting package aimed primarily at medium- to large-scale Digital Equipment Corp. VAX users who do not need the full functionality or have the data center resources required of its original Masterpiece family.

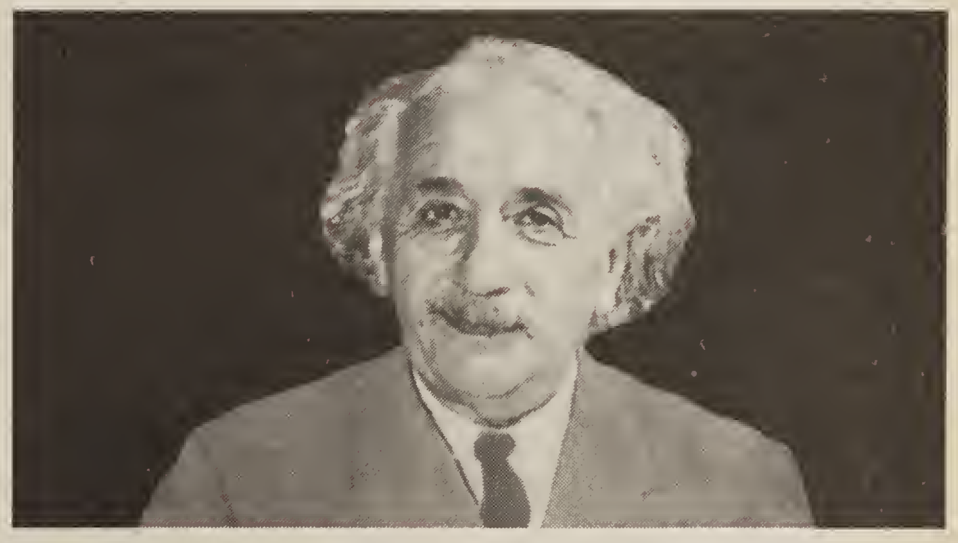
Called Masterpiece/ABS, the product line is a VAX/VMS port of Computer Associates' Advanced Business Systems (ABS) line of financial and distribution management software. ABS, which originally was designed to run on Data General Corp. hardware and was later ported to the IBM mainframe environment, was acquired from Stuart P. Orr & Associates in 1983.

While there is some function-

Continued on page 28

Inside

- On-Line Software enhances its Verify CICS QA tool. Page 27.
- Sotas offers accounting package for Wang VS mini series. Page 28.
- Utility to compress data for archival backup added by Information Management Software. Page 32.



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* Emc^2 supports its own super-economical, multi-user environments to vastly enlarge the population that can use it VAP is a special VTAM application for MVS and VSE. FIVS is the multi-user Fischer International Virtual System for VM

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Grochow

CONTINUED FROM PAGE 25

Almost all of the work in tool integration depends on the cooperation of tool vendors. Several provide extract files of your data in an easy-to-use form. Some vendors provide "programmer interfaces," libraries of routines that directly access their dictionary or internal files.

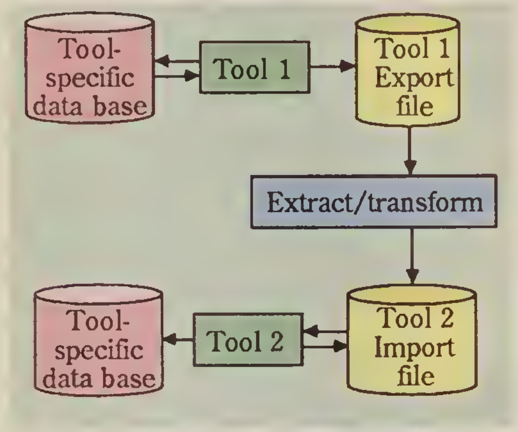
An example of this would be the Excelerator Programmer's Interface from Index Technology, which provides both read and write functions.

Others use industry-standard file-access methods to allow programmers to write their own access routines.

The most notable example of this is the burgeoning use of DB2 as a mainframe data base by vendors of dictionary systems and application generators.

Import-export communication

Both CASE tools provide import-export commands



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In any event, you will probably need one of your better programmers to design interface programs and make them work, particularly if micro-to-mainframe communication is involved.

Consulting firms are also starting to develop expertise in this area, often as part of their general CASE consulting work.

Specific methods

The most straightforward way of tying two or more CASE tools together is by "exporting" data from one and "importing" it to another.

For example, in some designer workbench products, you can create an ASCII file with some or all of the contents of the design dictionary by issuing a few simple commands.

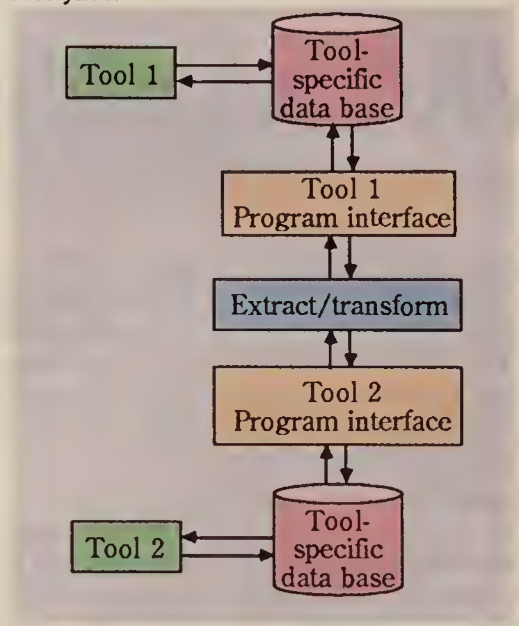
The file can then be read by programs to extract information or transform it into a format required by another tool — for instance, an application generator or mainframe dictionary system. The chart at left shows a schematic of this process.

A more direct form of integration involves accessing a tool's internal files directly. Unless you are into reverse-engineering commercial software tools, this method requires a vendor-supplied programmer's library.

While few vendors provide these today, there is a clear trend in this direction as vendors realize that this is one way of satisfying their users' unmet needs as well as "locking in" customers to that particular vendor's tools.

Direct data base communication

Tool provides direct program-to-program interfaces



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Once you have created a number of custom interface programs, you are likely to try to protect your investment by staying with that vendor. The chart above shows an example of how this might work.

Of course, in both of these methods, you have to be aware of any changes in file formats or routine calling sequences from one release to the next. This is particularly painful when vendors introduce import/export capabilities or programmers' libraries without determining the full range of what their users want or need.

Dream fix

The most desirable kind of integration is one that unfortunately isn't commercially available, namely a CASE environment in which tools of different kinds from different vendors all share the same central data base or repository.

When the designer workbench puts design information in a repository, which is also accessed by the application generator, our problems will be solved.

Recent rumblings from IBM indicate that it may be moving in the direction of providing such a repository, but it will still require a major cooperative effort on the part of CASE tool vendors to bring this common repository CASE environment to fruition.

The Information Resource Dictionary System ANSI standard, developed by the National Bureau of Standards, is one attempt to define what such a repository should look like. The chart below shows what a CASE environment might look like under a common repository standard.

Wrapping up

The issue of tying many vendors' tools together has not escaped the attention of the industry establishment. Currently, it is almost impossible to go to a CASE research gathering without seeing at least one session on standardization of tool interfaces.

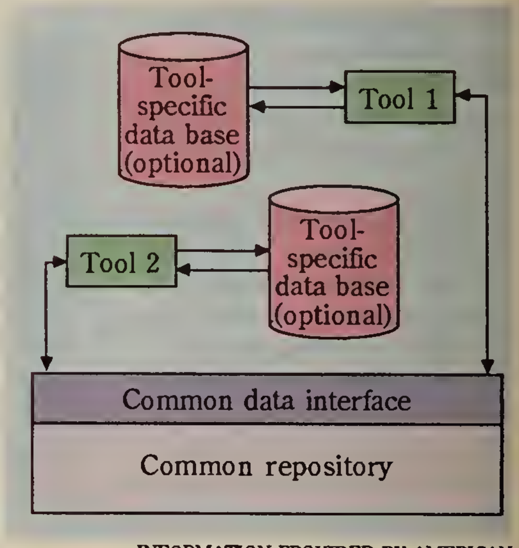
Among other groups, the IEEE Standards Committee on Professional Tools is attempting to develop a framework for tool integration that could be provided by all vendors.

The future will no doubt bring many new ideas for CASE tool environment integration, but until then, "us CASE users" will have to keep rolling our own.

Grochow is vice-president of the Corporate Technology Group of American Management Systems, Inc. in Arlington, Va.

CASE tools using a common repository

All tools use a common repository as their primary data store


Tool-specific data base (optional)
Tool 1
Tool 2
Tool-specific data base (optional)
Common data interface
Common repository

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Cameo

CONTIUNED FROM PAGE 25

data directly from the manufacturing floor. Through a broad range of data manipulation features, it allows engineers to analyze the information collected.

Although Camstat was primarily designed as a statistical process control tool, it also functions as a general statistics package, said Dave Budenaers, director of development at Cameo. Offering a complete set of common statistical functions as well as extensive documentation and reporting features, Camstat offers "about 80% of what the high-end statistical software packages [offer]," Budenaers claimed. The absent 20%, he explained, included "basically, the whole business of experimental design," which is scheduled to be among the enhancements featured in the second Camstat release, due early this summer.

Every manufacturing company has to work within a given set of engineering tolerances, Budenaers said. "What you've got to do is make sure that the variables stay within the tolerances," he said.

The software simultaneously supports parametric, attribute, character and date variables. Data manipulation features let the user create data subsets, change and transform values, filter out subsets of information and restore or switch between subsets with a single keystroke, Budenaers said.

In addition, he said, Camstat's menu-driven structure and full-screen data entry and editing facilities make the software relatively easy to learn and to use, while full-color or shaded-pattern presentation graphics and detailed documentation ability enable users to display results in a variety of charts and graphs and preserve them as reports.

Available this month at prices ranging from $649 to approximately $1,100, Camstat runs on the IBM PC AT, Digital Equipment Corp.'s VAX, Data General Corp.'s MV series and Hewlett-Packard Co.'s 9000 Series 800.

SOFT NOTES

M&D moving, consolidating operations

McCormack & Dodge Corp., currently operating out of two locations in Natick, Mass., said it will relocate its corporate offices to a new $60 million headquarters building in neighboring Framingham, Mass. According to M&D, construction of the 450,000-sq-ft facility should begin in mid-1988, with occupancy slated for mid-1990. The 900-employee firm is making the move in anticipation of continued employee growth.

Micro Data Base Systems, Inc. in Lafayette, Ind., supplier of the MDBS III personal computer-based data base management system, is moving up. The company plans to provide a version for mainframes running IBM's VM later this year through an agreement with **Interactive Data Corp.** in Lexington, Mass.

Amperif Corp. in Chatsworth, Calif., has acquired **HDR Systems, Inc.** in Omaha, producer of a Unix-compatible SQL-based relational data base management system called Noah. Amperif offers the RDM/2 data base machine that interfaces to Unisys Corp. mainframes, minicomputers and PCs.

Prime Computer, Inc. has produced a version of its Information EXL data base management system that runs on the firm's Unix-based supermicro, the EXL 316. The EXL 316 runs AT&T's Unix System V, Release 3 and can run Unix and Microsoft Corp.'s MS-DOS simultaneously.

Execucom Systems Corp.'s IFPS/Plus financial planning and modeling package is available on the **Apollo Computer, Inc.** family of Domain 3000 and 4000 workstations, spokesmen for Execucom said.

Tesseract Corp., the human resource software supplier that is a subsidiary of The Prudential Insurance Company of America, has announced that its product line will support operations with IBM's DB2 by June.

Cybermation, Inc. is offering its Execution Scheduling Processor in five subsets priced from $3,000 to $7,000. The job scheduling package is being offered in pieces for the smaller, budget-conscious user, according to Tina Rogers, manager of marketing and sales at the Markham, Ont., firm.

Natural Language, Inc. has ported its NLI Datatalker to the Sun Microsystems, Inc. Sun-4/110 worksation. Datatalker is used for natural language queries to data base management systems.

MAI Basic Four, Inc. in Tustin, Calif., has acquired the credit union applications of **The Computer Group Ltd.** in Anchorage, Alaska. According to the company, the applications are licensed to 100 credit unions in the U.S. to run on MAI Basic Four computers.

On-Line Software boosts CICS tool

BY SUZANNE WEIXEL
CW STAFF

FORT LEE, N.J. — On-Line Software International, Inc. recently added features to Verify, its CICS quality assurance tool, designed to support more output devices, strengthen large-volume testing capabilities and simplify use.

According to a company spokesman, Verify helps ensure proper functioning of new or modified CICS applications. Designed for interactive operation, the tool enables a programmer to react immediately to differences in test results rather than browse through the differences after they occur, the spokesman said. Programmers can choose to use on-line or batch-mode testing.

Release 3.0 of the software provides support for additional terminal types used in rerunning test cases. In addition to the IBM 3270 terminals supported by earlier versions, Verify now supports IBM 3600, 4700 and TWX sequential devices that are used as banking terminals, automated teller machines and teletypewriters.

Applications testing made easy

A utility intended to simplify testing for applications that generate numbers has been added. Called Store and Forward, the utility allows the user to take work-in-progress fields from an output screen during a Run function and place them in subsequent input screens. A Run Screen Exit feature for further customization was added.

Other features include the ability to run test streams using real terminals as well as virtual terminals and the ability to capture production transactions for reexecution and forward recovery in addition to a selection screen said to allow a user to choose screens for either browsing or editing.

Verify was originally released in 1985. A permanent license for the DOS environment costs $25,000; for the OS environment, it costs $37,500. Release 3.0 is available immediately.

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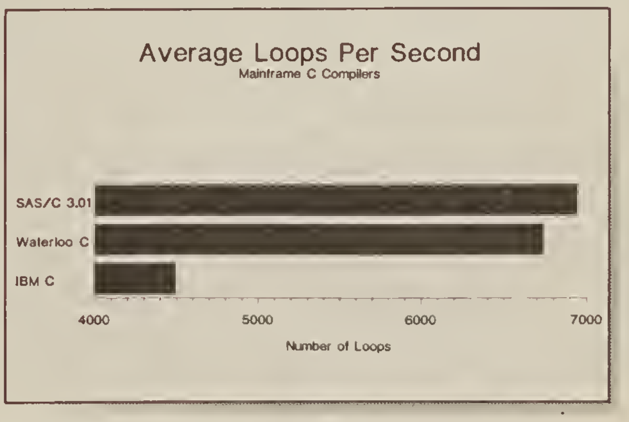

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CAD/CAM bundled for desks

BY NELL MARGOLIS
CW STAFF

BEDFORD, Mass. — Computervision Corp. is repackaging the most often used portions of its Computer Aided Design and Drafting System, or CADDS, software and bundling it with the recently introduced Sun Microsystems, Inc. Sun-3/60-based Model 33 workstation to offer individual computer-aided design and manufacturing (CAD/CAM) users a niche-specific, desktop CAD/CAM package.

Aimed at the mechanical, electronics, architectural, engineering and construction markets, the Professional Series Caddstation systems are available now at prices ranging from $29,900 to $45,000 with a monochrome monitor and $31,900 to $45,000 with a color monitor.

The series comes in three flavors. Professional Designer gives the user a two- and three-dimensional design and drafting system with multiple views and a second, more sophisticated level that further allows the user to use common surfaces with fillets and blends.

Professional Mechanical Engineer packages physical properties calculation, finite-element modeling and analysis and documentation features with an engineering calculator that can perform symbolic computing.

Professional Machinist, targeted at 2- and 2½-axis milling and turning applications, lets manufacturing engineers create tool paths for parts designed with the aid of CADDS software.

Interface adds windows

All Professional Series software includes the menu-oriented mouse-driven Computervision user interface, which features icons and windows, a company spokesman said.

Moreover, Professional Series applications all generate complete CADDS data bases. As users contribute information, the Professional CADDS Interface reconciles and updates the central data base.

Built on industry standards, the system runs on Unix, across Transmission Control Protocol/Internet Protocol and Ethernet and complies with the Network File System standard.

Order tracking tool runs on Wang VS

HAVERHILL, Mass. — The latest offering from Wang Laboratories, Inc. VS-based software manufacturer Sotas, Inc. is a purchase order and receiving package that is integrated with Sotas's Accounts Payable software and can be integrated with the Sotas General Ledger financial system, according to the vendor.

Sotas P/O is aimed at allowing users to keep timely, accurate records of purchase orders of any size and type by verifying information and updating the system as data is being input, according to Sotas President Chester J. Domoracki.

The product is based on the purchase order module developed by California-based MCBA, Inc. Already popular on the Digital Equipment Corp. VAX platform, the MCBA module lent itself readily to adaptation to the Wang VS environment, Domoracki said. The software lets the user enter and edit normal and blanket purchase orders as well as receipts, rejections and the reasons for rejections on-line. It reports scheduled receipts, notifying the user when shipments arrive early or contain either more or less product than expected.

Geared toward multiuser and multicompany use, the purchase order package can run reports as a background task, freeing the workstation for other work.

Prices range from $7,000 to $15,000, depending on system configuration.

Accounting

FROM PAGE 25

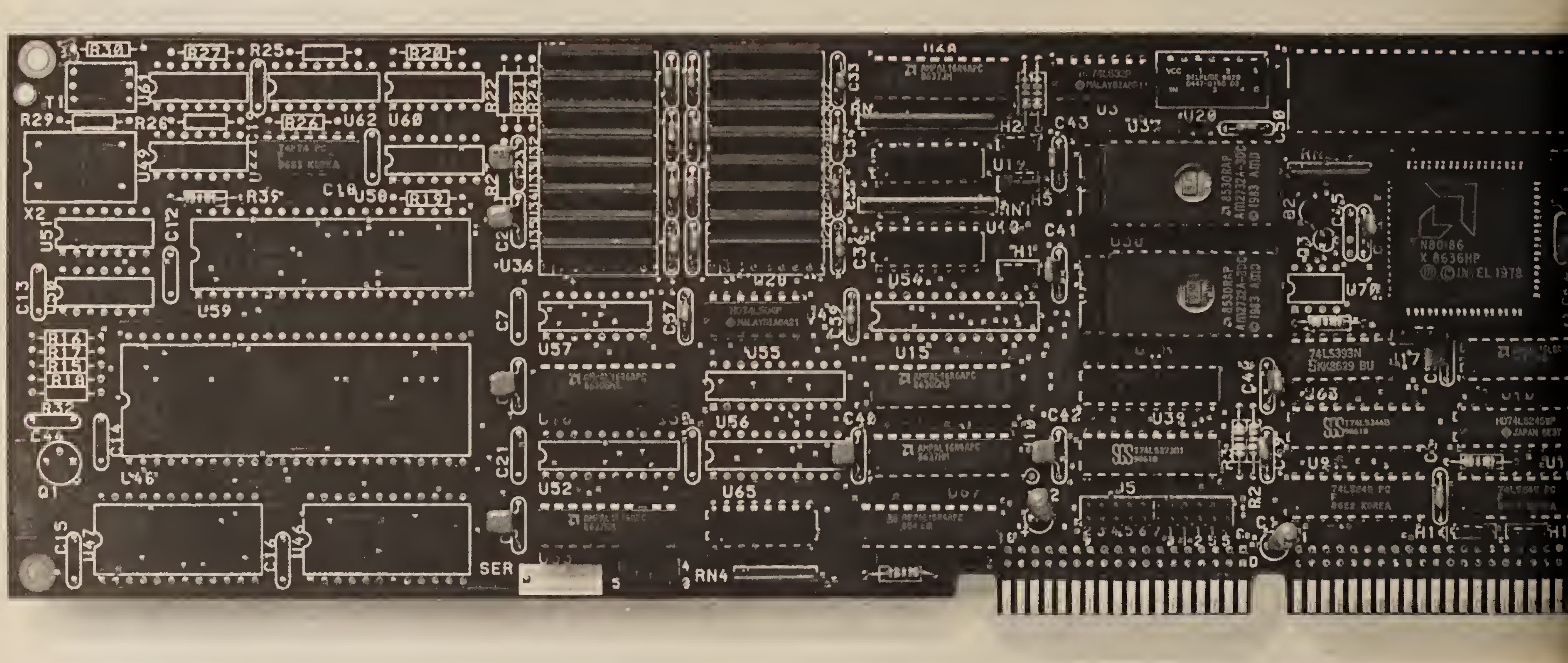
al overlap between Masterpiece and Masterpiece/ABS, the two products complement each other, said Mark Wasilko, senior vice-president of marketing.

The new product line is targeted at smaller, centralized companies with limited data processing personnel because it is easier to install and maintain. Masterpiece is aimed at larger, decentralized corporations, he added.

The package is offered in a modular form, enabling users to purchase only those applications they need. Modules include general ledger, accounts payable and receivable, order processing, inventory control, purchasing, fixed assets and payroll. Each module within Masterpiece/ABS is individually priced based on the size of the VAX used. Module prices range from $8,500 to $30,000, noted Gary Layton, Application Products division marketing manager. Users who upgrade to Masterpiece within three years can apply 75% of their purchase price to the higher end product, Layton added.

Masterpiece/ABS requires VMS 4.2 or higher, RMS file management system, an ANSI Cobol compiler and compatibility with DEC VAX tape and disk drives, Computer Associates said.

As with its Masterpiece line, Computer Associates will offer an interface between Masterpiece/ABS and its Business Decision Software (BDS) line. BDS consists of Ad-Lib, a menu-driven, dictionary-oriented reporting tool; CA-Strategem, a decision support and analysis tool; and CA-Tellagraf, a business graphics package. The interface will be available in June and is free to customers, Layton said.



If you're trying to make your LANs run real-time communications to your mainframe, the solution is RabbitGATE.™ Because the brains behind RabbitGATE—an on-board intelligent processor—does all of the communications processing. This means it runs the gateway software without dedicating the PC as a gateway server.

And at 56Kbs, no one outruns RabbitGATE. Or out performs it. With its 80186 processor and 512k of RAM, you'll get more speed and performance than any other 3270 remote host connection for NETBIOS LANs.

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3090Es in parallel

BY CHARLES BABCOCK
CW STAFF

IBM is offering a compiler that it said enables the company to characterize its 3090E series as parallel processors for general-purpose computing.

IBM has named the compiler and its associated support library Parallel Fortran.

An extension of IBM VS Fortran II, Parallel Fortran analyzes a program and automatically allocates pieces it to multiple processors, according to the company.

In tests using a dedicated 3090 600E, Parallel Fortran was able to speed up a numerically intensive organic chemistry program that had been 97% converted to run in parallel mode.

The program ran nearly twice as fast in parallel — by a factor of 1.9 — using two processors and 5.3 times as fast using six processors, according to spokesmen for IBM's Engineering Scientific Systems Development and Technology Division.

For a high-energy physics program that had been 92% effectively converted to parallel processing, the speed was up by a factor of 1.8 and 4.3, respectively, on the two machines.

A thin-layer fluid dynamics program that had been 89% effectively converted to parallel processing enjoyed throughput improved by factors of 1.8 and 3.9, respectively, the IBM spokesmen said.

IBM's PR/SM

FROM PAGE 25

maintain VM expertise in-house to run multiple systems," said Romney White, president of VM/CMS Unlimited, Inc., a VM software supplier in Boston.

White suggested that PR/SM is a shot at Amdahl Corp., which has been providing a similar capability in its Multiple Domain Facility since 1984.

PR/SM reportedly allows users to split a 3090E model into four logical partitions. Multiprocessor 3090s could run up to four operating environments on each side of the system for a maximum of eight.

For those 3090E shops interested in the PR/SM feature as a substitute for VM, the monthly savings will be $4,500, which is the monthly fee for VM/XA. There is also a savings from eliminating the need for VM expertise in the MIS department.

The PR/SM hardware option costs between $60,000 and $200,000, depending on the CPU.

"We're not lessening their dependency on VM," Wilson said. "We're giving them more options beyond VM. If users need other VM capabilities, we're telling them to continue with VM."

PR/SM is a renamed and enhanced version of the Multiple High Performance Guests Support (MHPGS) feature that IBM announced with VM/XA last year.

In both cases, up to four operating systems can function as preferred guests, achieving "near native" performance, according to Wilson. Previously, only one guest operating system was designated as "preferred," while other operating systems would run at approximately half the performance they could achieve in native mode.

MHPGS will be available to VM users as PR/SM, Wilson added.

BMC offers IBM alternative

BY NELL MARGOLIS
CW STAFF

SUGAR LAND, Texas — BMC Software, Inc. says it created Reorg Plus for DOS/VSE to give DL/1 data base users a faster, more efficient alternative to IBM unload and reload utilities. According to early users, the company has succeeded:

"We had a file with two to three million records. Every time we reorganized it, it took us seven or eight hours," said Gene Sobota, senior systems program manager at Murrysville, Pa.-based Beckwith Machinery Co.

"Our only alternative was IBM's utilities, so that's what we used," he said.

The reorganization task was so time-consuming and unwieldy, Sobota said, that he was willing to try BMC's product as soon as he heard of it, on the off chance that it might actually meet its claim to beat IBM's time. Soon after he bit, Sobota bought.

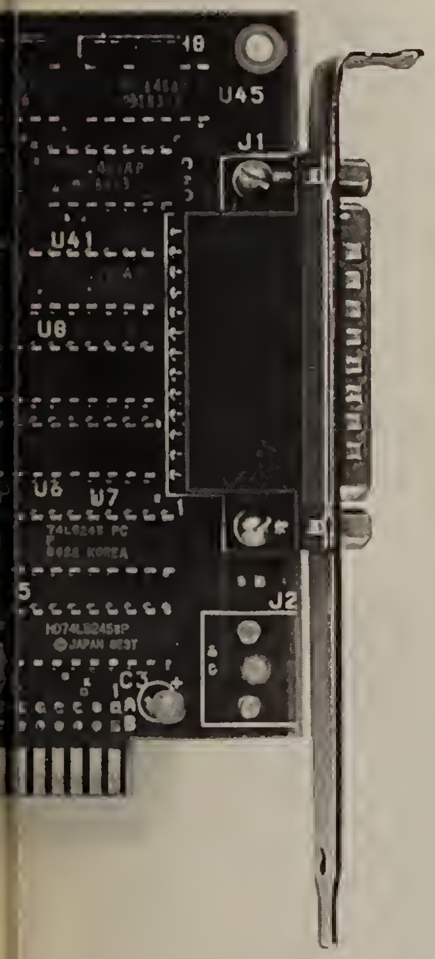
"With Reorg Plus, we've got the job down to about three hours and 15 minutes. On a small, 51-file data base, we did the whole reorganization process in five minutes. Before Reorg Plus, it would have taken us at least two hours," he said.

The substantial speed increase, according to a BMC spokeswoman, lets users reorganize files more often. Frequent reorganizations, in turn, lead to improved data base performance, not to mention less off-line time.

The Reorg Plus package, which supports all current versions of DL/1 and DOS/VSE, includes separate unload and reload utility programs and a load program interface. Search algorithms let the user control the placement of segments in the data base, reducing total I/O necessary for data retrieval, a company spokeswoman said.

"Before we had Reorg Plus, it took us 20 to 25 minutes to run a program just to find out if we had a problem," Sobota said. "That was just to get a print. We'd still have to go in there and flag the error for deletion." The BMC software "gives us a printout that tells us whether or not there's an error and, if so, exactly where it is."

Reorg Plus for DOS/VSE is available immediately at prices ranging from $5,850 to $15,600, depending on CPU.



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NEW PRODUCTS

Systems software

A Unix version of the **Stata** statistical, data management and graphics software program has been introduced by **Computing Resource Center.**

According to the vendor, Stata is capable of performing analyses on data sets of up to 32,000 observations.

Stata will be available for Sun Microsystems, Inc. workstations and the Digital Equipment Corp. VAX, according to Computing Resource Center. Prices range from $2,500 for a five-user license to $8,500 for a 100-user license.

Computing Resource Center, 10801 National Blvd., Los Angeles, Calif. 90064. 213-470-4341.

Version 5 of the **Integrated Manufacturing System** for custom-build manufacturers has been introduced by **Computer Covenant Corp.**

In Version 5, application programs have been bound into one executable image, and virtual memory is used to speed processing.

Included in the system are hardware-independent ANSI terminal support, a menu switching procedure and an application-driven security system. The system includes Quotation Tracking, Order Processing/Inventory/Invoicing, Bills of Material/Routing, Materials Inventory/Purchasing, Tool Inventory, Job Cost/Tracking, Production Planning/Control and Financials.

Prices range from $1,000 to $3,500 per module.

Computer Covenant, 4 Forest Park Drive, Farmington, Conn. 06032. 203-677-6563.

Utilities

A mainframe computer software utility that compresses data for archival backup has been announced by **Information Management Software, Inc.**

Dascomp runs as a batch program under the IBM MVS/XA operating system. According to the vendor, it compresses either fixed- or variable-length records within sequential or partitioned data sets to an 8-1 ratio. It will compress either ASCII or EBCDIC text files and operates on a file by file basis.

Dascomp is priced at $18,000.

Information Management Software, Suite 223, 2899 Agoura Road, Westlake Village, Calif. 91361. 818-991-4246.

A performance and maintenance tool for the IBM IMS DL/1 Database Administrator has been introduced by **The Schumann Consulting Group.**

DBC runs as a batch program in an IBM MVS or MVS/XA environment. It provides data base and volume free-space analysis, record length distribution and root and segment pointer validation. It also provides a detail and summary tracing with response times for DL/1 calls at the segment level, the vendor said. DBC is viewed online through a series of IBM ISPF panels. Help screens are included.

The fully configured version of DBC costs $30,000.

The Schumann Consulting Group, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632. 201-569-7335.

SCIENCE/SCOPE®

NASA's Magellan Mission will carry only one scientific instrument during its detailed mapping exploration of the planet Venus. The Hughes Aircraft Company-built synthetic aperture radar (SAR) will gather data in greater detail than any of the previous 20 U.S. and Soviet Venus probes. It will transmit images 30 times sharper than those gathered by the Hughes-built Pioneer Venus, which provided the first extensive scientific study of the planet. In a fixed polar orbit, Magellan will take 243 days to map nearly all of the planetary surface, taking pictures for 37 minutes during each of its three-hour orbits. The remaining time in orbit will be spent transmitting the data back to scientists on Earth.

Revolutionary "smart skins" will integrate avionics and sensors directly into the skin and structure of future aircraft and space vehicles. As part of the U.S. Air Force's Project Forecast II, Hughes is working with the USAF Avionics Laboratory to develop concepts and applications for a new generation of avionics. Systems using these technologies will provide levels of performance, reliability, and fault tolerance not possible in current conventional avionics systems.

A focal plane module for a long-wavelength infrared sensor designed for space surveillance is capable of withstanding high radiation levels. Developed for the Strategic Defense Initiative Organization, the Hughes-built module is the heart of the sensor, and can detect and survive radiation resulting from a nuclear detonation or radiation that is naturally present in space. The key to its survivability is a new radiation-hard, silicon material prepared with gallium or arsenic. These detectors are thinner than conventional ones, allowing most high-energy radiation to pass through them without creating false signals.

A speech-recognition system developed at Hughes is capable of saving approximately $1.5 million per year in data entry and handling costs alone. After successful prototyping, the system was put on line in radar assembly areas. The voice input system allows inspectors to describe problems in plain language to personal computers, which have vocabularies of up to 1,000 words each. The computers give verbal instructions, repeat the inspector's words for verification, and then record the information. This lets operators keep their eyes and hands on the products they are inspecting. It is estimated that paperwork will be reduced 80 to 90 percent, and human errors caused by manually typing information into the computers will be eliminated.

Support Systems in Southern California designs, develops, and manufactures some of the most sophisticated training simulators and a wide array of automatic and manual test systems. In addition, field engineering and technical support of a wide range of electronic systems keep Hughes' systems operating at top efficiency worldwide. Opportunities are available for a variety of engineers qualified by degree or extensive work experience. They include systems engineers, radar engineers, and software and hardware design engineers. Please send your resume to Lowell Anderson, Professional Employment, Dept. S3, Hughes Aircraft Company, P.O. Box 9399, Long Beach, CA 90801-0463. Equal opportunity employer. U.S. citizenship required.

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MICROCOMPUTING

MICRO BITS

Douglas Barney

Letting the users decide

What if users called the shots? Every time a product is late because of overambition or wreaks havoc because of major incompatibilities, close your eyes and imagine what the world would be like if users called all the shots.

First of all, vendors would be either shot or penalized $500 per package (even on a $150 package) for every instance of copy protection. They would also be penalized — say, for the cost of a free upgrade — if they charged for support or used new file formats incompatible with the rest of your applications.

Bugs due to poor quality assurance testing would merit a coupon giving you half off the vendor's competitor's product, and late products would come bundled with 10 shares of the company's preferred stock.

If users had their way, every program would share an interface that wouldn't be bit-mapped, documentation would make sense, and support lines would be open.

Put a user in charge of a major software vendor and preannouncements would cease. Instead, the company would

Continued on page 36

Microsoft ships PC booster

Mach 20 ups desktop units' memory, provides hardware for OS/2, Excel

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Microsoft Corp. gave low-end personal computer users a high-performance boost last week by releasing its Mach 20 Performance Enhancement System accelerator board.

The add-in card is aimed at upgrade-hungry users of Intel Corp. 8088-based IBM Personal Computers or fully compatible machines who want more memory and horsepower on their desk tops. The Mach 20 gives users the hardware needed to run next-generation programs that would otherwise be out of reach, including Microsoft's Excel and the MS OS/2 operating system.

The board should help Microsoft gain acceptance for its advanced software programs in the low-end 8088-based market, which makes up the bulk of today's installed base of PCs.

The Mach 20 consists of an Intel 80286 microprocessor, 16K bytes of cache memory, a 16-bit data bus and Microsoft's Inport Mouse interface. The base unit costs $495 and is available now.

But end users who want to run Excel and OS/2 will have to buy an expanded memory board, priced at $395, to handle the extra load of those programs, according to Microsoft. The Memory Plus board is compatible with the Lotus/Intel/Microsoft Expanded Memory Specification 4.0 and can support up to 3.5M bytes of memory, according to Microsoft.

Although the Mach 20 can run on IBM PC XTs and such compatible machines as the Tandy Corp. Tandy 1200, Microsoft is not making any promises of widespread compatibility with clones. "We're entering the market with caution," said Rich Abel, senior product manager

Continued on page 38

Data View

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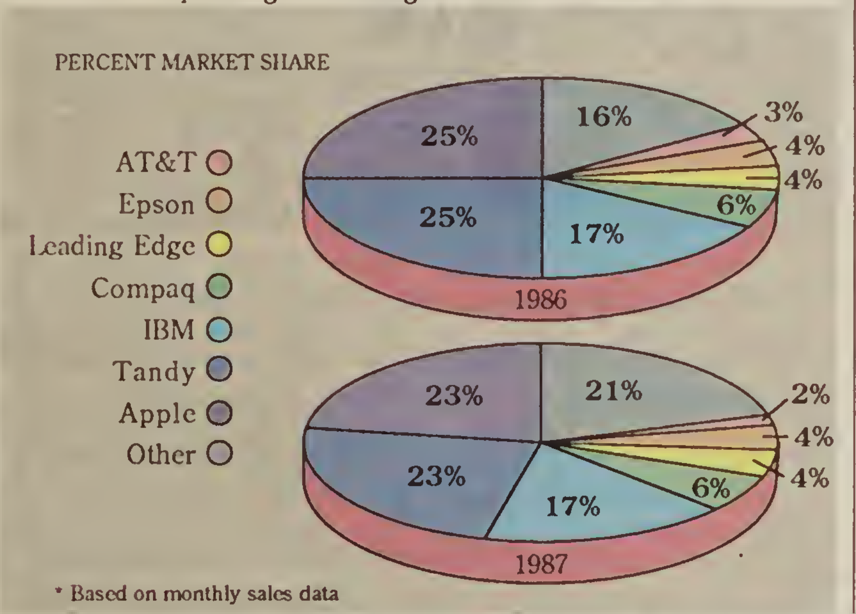

* Based on monthly sales data

INFORMATION PROVIDED BY INFOCORP AND TANDY CORP.
CW CHART

Powerhouse goes to PCs

BY NELL MARGOLIS
CW STAFF

OTTAWA — Cognos, Inc. recently said it will go after workstation users and independent software developers with a microcomputer version of its Powerhouse fourth-generation and application development language that runs under both Microsoft Corp.'s MS-DOS and IBM's OS/2.

According to Cognos, nothing was lost in the translation of the popular mid-range-based software package to the personal

Continued on page 38

User gives Graph Plus thumbs-up

BY ALAN J. RYAN
CW STAFF

RICHARDSON, Texas — Micrografx, Inc. is shipping beta-test versions of Graph Plus, an enhanced version of its Windows Graph product that incorporates full support for Microsoft Corp.'s Windows 2.0 user interface.

The general release version of the product will be available in April, according to George Grayson, president of the company.

Graph Plus's Windows support includes the Windows 2.0 Multiple Document Interface and Dynamic Data Exchange, Micrografx said.

One user at a large West Coast company uses the Graph product for business sales projections charts and engineering scatter plots. He said a particularly useful feature of the product is its ability to import data from his IBM mainframes. For the company's business require-

Continued on page 38

Inside

- Faraday president reviews pros, cons of Micro Channel-compatible chips. Page 35.
- HP makes impression with low-priced laser-quality printer. Page 35.
- NEC enhances APC IV Powermate 1 PC. Page 40.

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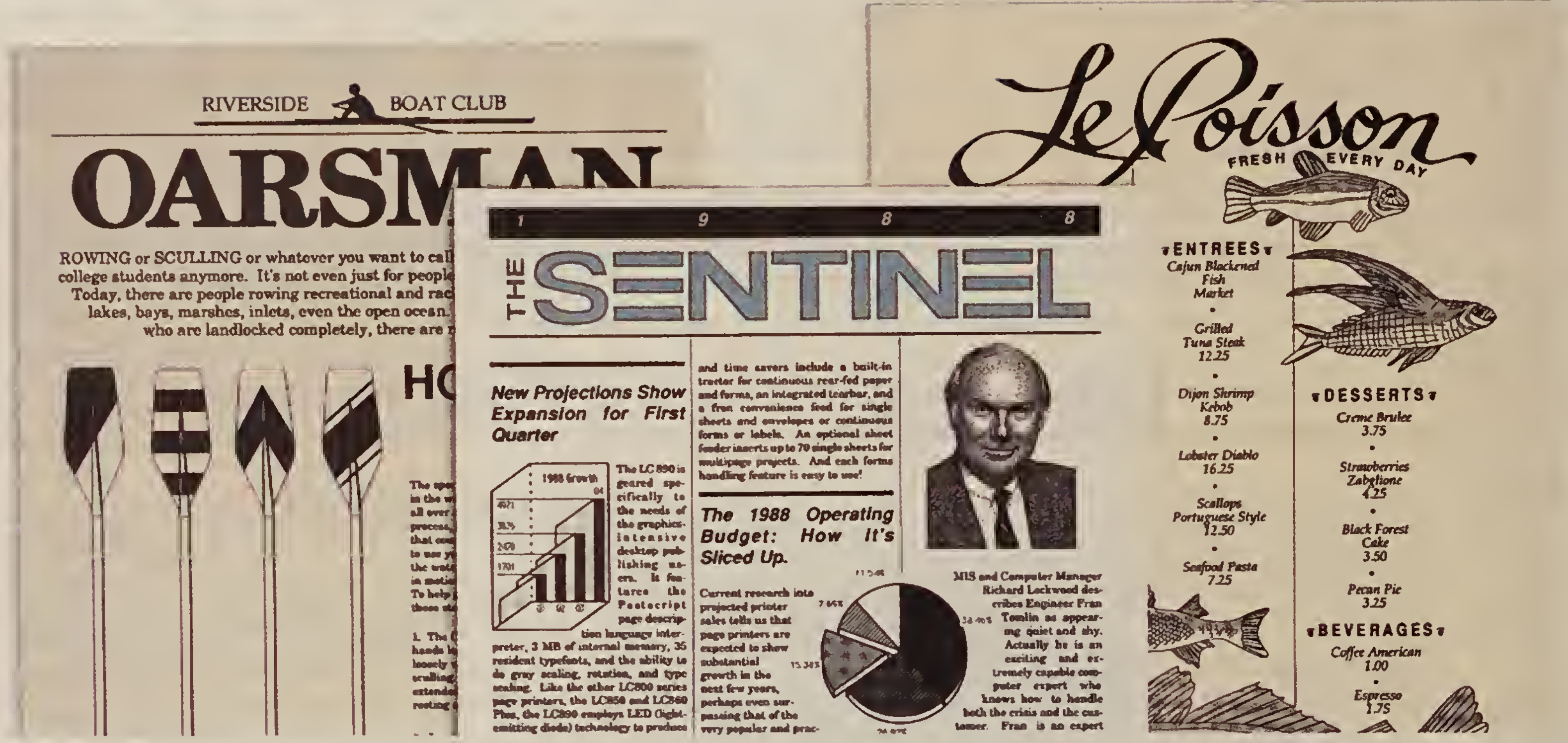

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who are landlocked completely, there are

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THE SENTINEL

New Projections Show Expansion for First Quarter

1988 Growth

The LC 890 is geared specifically to the needs of the graphics-intensive desktop publishing users. It features the Postscript page description language interpreter, 3 MB of internal memory, 35 resident typefonts, and the ability to do gray scaling, rotation, and type scaling. Like the other LC800 series page printers, the LC850 and LC860 Plus, the LC890 employs LED (light-emitting diode) technology to produce

and time savers include a built-in tractor for continuous rear-fed paper and forms, an integrated tearbar, and a fron convenience feed for single sheets and envelopes or continuous forms or labels. An optional sheet feeder inserts up to 70 single sheets for multipage projects. And each forms handling feature is easy to use!

The 1988 Operating Budget: How It's Sliced Up.

Current research into projected printer sales tells us that page printers are expected to show substantial growth in the next few years, perhaps even surpassing that of the very popular and prac-

MIS and Computer Manager Richard Lockwood describes Engineer Fran Tomlin as appearing quiet and shy. Actually he is an exciting and extremely capable computer expert who knows how to handle both the crisis and the customer. Fran is an expert

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Our Silentwriter™ LC890 is the first desktop publishing printer that gives you both popular standards for creating graphics and type: true Adobe PostScript® and LaserJet Plus emulation.

That alone would be enough to cause headlines. But we also added many more features to simplify desktop publishing. Like both Apple and IBM compatibility. *PC Week* stated, "the LC890 is actually better than having both an Apple LaserWriter Plus and an HP LaserJet Plus on your desk." Equally impressed, *PC Magazine* awarded it an "Editor's Choice." And cited it in their "Best of 1987" issue.

PC MAGAZINE

EDITOR'S CHOICE

PC Week

NEC's SilentWriter Printer Boasts PostScript, HP LaserJet Plus Emulation

The new NEC SilentWriter LC-890 laser printer breaks new ground on several fronts. Until now, buyers of laser printers have been

NEC's LC-890 printer, however, makes that issue a moot point—and adds new meaning to the term "full featured." NEC

And because the Silentwriter has a simple, trouble-free printing mechanism, it will be creating headlines for years to come. In fact, it's twice as reliable as ordinary lasers, with an average life of 600,000 pages.

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MICRO BITS

Alan J. Ryan

Marriage of inconvenience

OS/2 is like a second marriage for MIS, but as in the days of bigamy, the first spouse is still lurking around, continuing to make particular demands.

But instead of supporting two wives, MIS departments face the equally arduous task of implementing and supporting the next-generation operating system while also supporting various versions of DOS.

Jim Danielson, supervisor of information systems at Bendix in Elyria, Ohio, says the entire OS/2 migration is a nightmare. However, he adds, waiting will only make matters worse. The longer he waits, the more Microsoft MS-DOS data he'll have when he decides to convert to OS/2. Other managers concur.

Although there are many who will not implement OS/2 until Extended Edition 1.1, incorporating the Presentation Manager, is available in November, some MIS managers have already started planning for OS/2. Careful consideration is being given to bringing the operating system in smoothly while phasing out the comfortable but somewhat backward world of MS-DOS.

Weaning users from MS-DOS could prove to be the most difficult and time-consuming challenge of all. Danielson says that even though his company's 500 MS-DOS users generally have few problems because of a

Continued on page 38

Legal hassles don't deter Faraday from chipping away at PS/2 clones

IN PERSON

The race for dominance in the IBM Personal System/2 Micro Channel clone market is already on, months before any vendor has dared to release such a potential hot potato.

Silicon suppliers such as Western Digital Corp., through its Faraday Electronics division, and Chips and Technologies, Inc. are on the verge of delivering their Micro Channel-compatible chip sets. In addition, virtually every major microcomputer vendor is reported to have a PS/2 Micro Channel look-alike in the works. However, one big question remains: What are IBM's lawyers going to do when a PS/2 clone hits the stands?

West Coast correspondent James A. Martin recently talked with Faraday's vice-president and general manager, Collier Buffington, on the legal, technical and manufacturing aspects of developing a PS/2 Micro Channel-compatible chip set and selling it to vendors.

Faraday's Buffington *says there's no mystery behind the Micro Channel*

Back in October, Western Digital announced it would release its PS/2 Micro Channel chip sets early this year. What is the status of the chip set now?

The first chips are in, and we're analyzing them now for compatibility. By industry experience, compatibility testing really never stops, but we expect to be shipping commercial chip sets in late April or early May.

How many OEM vendors have your chip set in hand now? How long have they had it?

We have released early silicon to a small number of OEMs that have major commitments and the engineering resources to help us with the compatibility issues. What we have out now are prototypes. There have been a few minor compatibility problems so far, but nothing major.

Can you say when we can realistically expect PS/2 Micro Channel compatibles to be announced by vendors using your chip set?

Probably in the May-June time frame. There will be a few manufacturers that will move aggressively; others will not feel an absolute pressing need. The rollout of Micro Channel products is going to start in May and most manufacturers will have something out by February 1989.

Continued on page 38

Deskjet makes impression in small-scale printer market

BY JAMES A. MARTIN
CW STAFF

By essentially offering laser-quality text and graphics in a printer priced at less than $1,000, Hewlett-Packard Co. seems to have a hot new product on its hands. The printer's prospects should also improve with the addition of much-needed drivers to many software packages currently not supported by the Deskjet.

The HP Deskjet, announced last month, is already causing talk in the personal computer world. Priced at $995 and below, the thermal ink-jet printer boasts the ability to print text and graphics with resolution close to that of HP's Laserjet printers — but at half the cost.

Printing 2 page/min, as opposed to the Laserjet's 8 page/min, Deskjet is aimed at individual publishing needs and is not suitable for networking environments. Its goal is to offer a quicker, higher quality alternative to dot matrix and letter-quality printers for light word processing, spreadsheet and graphics applications; on several counts, users said it exceeds admirably.

"I needed a printer that would handle complicated graphics that were scanned in from my HP Scanjet, one that would handle Chinese as well as English text. People are coming from all around the office to use my printer," said Michael Saso, professor of Asian religions at the University of Hawaii in Honolulu.

HP Deskjet

Price: $995

- 300 dot/in. resolution thermal inkjet laser-quality desktop printer
- 120 char./sec. letter-quality mode, 240 char./sec. draft mode
- Multiple fonts available via 12 snap-in font cartridges
- Employs HP Printer Command Language, compatibility with HP Laserjet software drivers

Most Deskjet users did not want to invest in a laser printer but were dissatisfied with slower dot matrix and letter-quality machines. "I didn't want to go the extra money for a laser printer in upkeep and in initial price," explained R. W. Kuhnemund, owner of Pro-Optics, an optical supplier in Ormand Beach, Fla. "The number of pages I needed to print was relatively small, so this printer was recommended to me, and the resolution is excellent." Although Kuhnemund admitted Desket's output is not as good as a laser printer's, he said it is "as good as any letter-quality printer I've ever seen."

But the printer is not problem-free. Because Deskjet is

Continued on page 38

OS/2 pours foundation for data base servers

Last of a two-part series.

BY RICHARD FINKELSTEIN
SPECIAL TO CW

ANALYSIS

Last week, we discussed the importance of a new breed of products, called data base servers, that run on microcomputers and exploit SQL's capabilities for data integrity and the efficient manipulation of data. We also touched on the approaching standardization of SQL, which will provide advanced communications and applications portability. This week, we will discuss the specific applications this technology makes possible.

A big boost for users and application developers will come from the open nature of the newest SQL products. Microsoft Corp., Lotus Development Corp. and IBM all support open architectures with SQL interfaces, allowing vendors to build standardized SQL interfaces that can access any or all of these servers. This allows vendors to leverage their development costs against a larger user base.

They are also freed from the costly task of building and maintaining their own data base managers and can concentrate their resources on building advanced end-user tools. This will ultimately translate into low-cost end-user products that can be brought to market much quicker and at very reasonable costs.

Data base servers will also accelerate the trend toward integrated application software. Users will be able to choose from any number of tools from different vendors, all of which will be able to access and share information from the same server. We will see traditional applications such as spreadsheet, data base and word processing merging with image and audio processing — all combined with object-oriented front ends.

Vendors that have many years of experience developing graphical interfaces on Apple Computer, Inc. Macintosh computers will be able to transfer their technological know-how to Microsoft's OS/2 Presentation Manager. Packages such as Odesta Corp.'s Helix data base management system or Geoquery software, which creates a map metaphor for data based on ZIP codes, can be ported to the Presentation Manager and then linked to the data base server using SQL.

Vendor support

Major software vendors such as Microsoft, Lotus, Borland International and Ashton-Tate Corp. will be introducing suites of integrated software that will access the common data base server information. Users will be able to mix and match as desired. In fact, Oracle Corp. is already delivering an add-in product that links Lotus's 1-2-3 to an Oracle data base.

Hardware advances will also make new applications possible. For example, IBM Personal System/2 Micro Channel hardware, which can accommodate multiple processors, will make possible specialized boards for the server that will support artificial intelligence applications, high-transaction fault-tolerant systems or automated data backup requirements. The Micro Channel can also support high-density storage media, such as optical disks, that can be used to store graphic, image and audio data.

Application developers can look forward to new, highly portable fourth-generation tools that

Continued on page 38

Barney

FROM PAGE 33

answer inquiries about product plans honestly and directly.

If users ran IBM, the Micro Channel would work with existing boards, and IBM would help others clone its machines. If users ran Apple, Macintosh clones would be in abundance and would actually offer color at a low cost.

Most of all, OS/2 would have been here two years ago, perhaps without a compatibility box, and would run quickly on the orginal 6-MHz IBM Personal Computer AT. "Look-and-feel" litigation would come to a swift end.

And everything would be cheaper and work.

The clones are coming! When IBM announced its Personal System/2 line last year, analysts and cloners predicted that PS/2 clones would arrive in about nine months. Well, nine months are almost up, and guess what? The clones are almost here.

According to a key source in the clone community, nearly a dozen silicon manufacturers — including the usual suspects, such as Intel, Western Digital and Chips and Technologies — are working on chip sets. Several firms are working on the BIOS, and some hardware manufacturers such as Compaq are doing all their own work.

This groundswell of development may well propel the Micro Channel into standardom by the 1990s, but like the older PC XT and AT, it won't be just IBM's standard.

If cloners do the job right and manufacture with surface-mount technology, the clones could be more advanced than present-day systems and could cost less. Also, the selection of PS/2 clones could put the customers back where they belong: In the driver's seat, pressuring IBM to drop its prices and advance its technology further.

But like the early days of IBM PC clones, there is a very real possibility that these machines will be less than compatible, and that users will be less than happy with them. The key test will be whether these machines can run IBM's unshipped, but nonetheless strategic, OS/2 Extended Edition or whether IBM will use some fancy footwork to prevent that.

Adolescent upgrade. A recent *Businessweek* article on Lotus President Jim Manzi's toughness (could have called him Macho Manzi) elicited a letter from a Lotus customer complaining about the firm's messy upgrade from 1-2-3 Release 1A to Release 2. Well, Jim called this customer to learn more about the problem and found out that the author was not a leading MIS professional but rather a 17-year-old who works at a drugstore. I guess this guy is not a hot prospect for 1-2-3/M.

By the time it gets here, we'll know how to use it. Noted Dbase aficionado Adam Green makes a good living teaching users the ins and outs of the current version of the popular data base management package. Knowing a good thing when he sees a pre-alpha-test version, Green has announced a course on Dbase IV, using an advanced version of the product provided by Ashton-Tate. The final version isn't set to ship until July.

Green will cover the product's unique features, including SQL, applications generation and better networking. Say, how does that bug work again?

You gotta love this guy. Nobody can speak quite so eloquently as a true Texan, and Tandy Chairman John Roach is no exception. While software vendors and users have railed somewhat awkwardly against lawsuits that seek to prevent copying of software users' interfaces, Roach reduced the issue to two simple sentences.

"Lotus took 'look-and-feel,' a romantic term, and turned it into fighting words. Such terms ought to be left to male-female relationships."

You can write this column any time, John.

Barney is a *Computerworld* senior editor, microcomputing.

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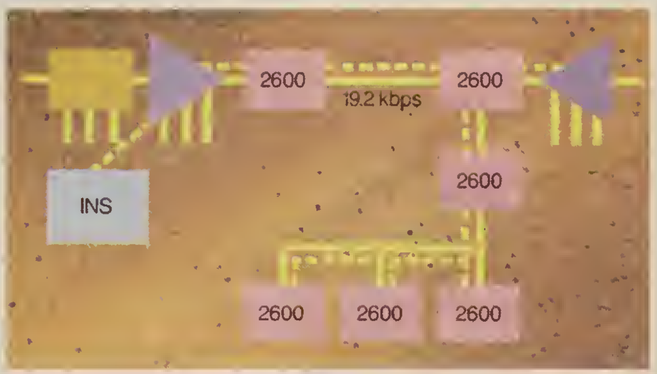

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OS/2

FROM PAGE 35

are explicitly designed to take advantage of the set-processing capabilities of relational data base servers.

Contenders

Ashton-Tate has already indicated that it will enter this arena with a portable Dbase IV. The firm will be competing against products such as Gupta Technologies, Inc.'s SQLwindows or similar development tools that are likely to be announced by Lotus, Borland and Microsoft.

Data base servers encourage both software and data integration. Again, SQL is fundamental to this link. SQL provides a common inter-data base language. Different dialects of SQL will complicate communications somewhat, yet by consolidating around IBM's DB2 SQL syntax, vendors can build the necessary links. Users who purchase DBMSs that only support subsets of SQL may find themselves locked out from the technology.

For IBM host-oriented applications, IBM's OS/2 Extended Edition lays a solid foundation for seamless access to distributed data between IBM's DB2, SQL/DS and OS/2 Extended Edition relational data bases. In this environment, OS/2 data base servers will be able to support moderate-volume departmental computing and be linked to mainframe hosts for high-transaction systems at the same time.

Answers for today

For those who need remote data access today, Gupta's SQLnet allows SQLbase application developers to transparently access other SQLbase servers as well as DB2. Both Relational Technology, Inc. and Oracle offer distributed data base technology that can link their data base servers and provide gateways to other relational data bases.

Network Innovations, which was recently acquired by Apple, is also promoting its SQL-based CL/1 language as a standard interserver communications language. Several firms already offer CL/1 links: Apple has Hypercard, Blyth Omnis 3.

Macintosh users will also benefit from server technology. They will have the ability to access SQL data base servers on shared networks such as Appletalk and 3Com Corp.'s 3Com+. Organizations should consider planning for this new environment now. Proper planning can help preserve hardware, software, installation and training costs. Migration can be accomplished either gradually or rapidly, as needs require.

Software vendors including Microsoft and Ashton-Tate have already announced moderate upgrade policies. Plans should be made to turn MS-DOS machines into workstations and introduce OS/2 computers as potential high-end workstations or servers.

Micro Channel hardware, OS/2 multitasking and SQL data base servers form the foundation of this new era in information processing. Although the equation is not complete until the new application products become available, the future for information processing shines bright and points in the direction of data base server processing.

Finkelstein is vice-president of Midwest operations in Chicago for the Codd and Date Consulting Group.

Powerhouse

FROM PAGE 33

computer environment. "All of the modules, all of the features, are there," said Christopher Fedorko, product marketing business manager at Cognos. Powerhouse currently has 9,000 installations.

According to an early user, Cognos is not kidding. "It's Powerhouse — the same features, the same syntax," said Suzanne Harman, vice-president of AH Computer Services, Inc., a Powerhouse PC beta-test site.

Powerhouse PC includes a data dictionary, a dictionary reporter, a screen design and data input module and a volume transaction processor and report writer. In addition, Fedorko said, Cognos reengineered the product for the microcomputer environment, adding a terminal emulator, a source-code transfer facility and a data, file and application transfer facility.

In the first PC implementation, Powerhouse offers Hewlett-Packard Co. terminal emulation; subsequent versions will bring on emulation of Digital Equipment Corp.'s VT220 and VT100 and Data General Corp.'s Dasher D 400.

Harman encountered some problems during the beta test that she said Cognos has worked aggressively to solve, and did.

Available immediately at $1,295 for a single copy and with multiple-copy discounts, Powerhouse PC runs on IBM Personal Computer ATs or compatible Intel Corp. 80286- and 80386-based machines.

Deskjet

FROM PAGE 35

new, only a handful of software drivers exist to interface the printer with software applications, forcing those who use the less popular programs to depend on the Laserjet driver or an Epson America, Inc. FX80 emulation cartridge offered by HP. The latter methods do not always take advantage of the Deskjet's specific capabilities, causing some minor problems with, among other things, font selection.

"HP tells me it won't be a problem much longer, as they are working on writing software drivers for most applications," Kuhnemund said.

"It seems to be a case of the hardware coming first and the software maybe will follow," he added. "If a complete beginner bought this printer, I don't think he would be very satisfied at the fact he simply bought a $1,000 letter-quality printer that makes very little noise."

Another user expressed dissatisfaction at the printer's handling of envelopes. "For some reason, when you feed in the envelope and send the signal to the printer, the envelope comes out once with nothing on it, and you have to feed it back in a second time before it is printed," said Charles Rauh, sales and marketing manager at Air Conveying Corp. in Memphis. "But," Rauh said, "that is my only complaint about the printer. I'm happy enough with the Deskjet not to scream about the envelopes."

Graph Plus

FROM PAGE 33

ments, he said, Graph seems to be the best product on the market. But in the engineering side of the business, "We're looking for more applications than Graph offers," he added.

Enhancements the user said would be useful in future versions include batch processing similar to that offered in Microsoft's Excel, macro capabilities and improved text processing.

According to Micrografx, Graph Plus's features include an integrated drawing editor, the ability to add or replace data in existing charts and bit-map support. Graph Plus also offers desktop presentation capabilities through its device driver support for the Videoshow Presentation System from General Parametrics Corp.

Suggested hardware requirements for Graph Plus are an IBM Personal Computer AT or compatible with a mouse, an IBM Enhanced Graphics Adapter or Video Graphics Array card for color, a graphics monitor and a printer.

Graph Plus reportedly supports all I/O devices that are compatible with Windows, including graphics cards, graphics displays, mice, light pens, digitizing tablets, plotters, color printers, laser printers and dot matrix printers. At $395, Graph Plus is a little pricey, the user said, but he added that Micrografx offers discounts. The Videoshow driver retails for $99.

Faraday

FROM PAGE 35

Have legal issues kept any big orders from coming in?

All that uncertainty does affect us, because some vendors are concerned, some are not. Some feel they have reasonably strong patent licensing agreements with IBM and can proceed with no problem. I know of no company that is not working on a Micro Channel product. Whether they actually bring one to market, I don't know.

Have you in fact received any big orders, something that would indicate that a PS/2 compatible using your chip set is definitely in the works?

We have design commitments from several major manufacturers — a mixture of American, Asian and European firms.

What, if any, are the differences between the PS/2 Micro Channel-compatible chip sets offered by Western Digital and those by Chips and Technologies or others?

Ours offers a higher level of integration and requires fewer external parts to develop PS/2 products than other chip sets do. Therefore, the cost to build a system is lower. Our technology is 1¼ CMOS gate-array semiconductors, which means it's easy to build a laptop or any other low-power system.

In your efforts to reverse engineer the Micro Channel, have you made any interesting discoveries or gained any special insight into the inner workings of that architecture?

The technology is really not that mysterious. What separates the Micro Channel from the [IBM Personal Computer] AT bus are three big areas: the direct memory access controller, the programmable option select that lets you install add-in cards without setting DIP switches or jumpers and the central arbitration control point, which is the logic that allows you to have multiple masters. None of this is new or revolutionary; the Micro Channel is an evolutionary product.

What kinds of end users will buy a PS/2 Micro Channel compatible? Why should they take all the risks with lawsuits, incompatibilities with OS/2 Extended Edition and so on just to save a few bucks?

I think they will be skeptical initially, but once sound products are out there, they will come around. The big users — banks, airlines and so on — are buying tens of thousands of machines per year, so it's not merely a cost savings to them but also a means of control over IBM. These big companies using IBM's architecture have always gone out and bought massive amounts of products from compatible vendors; it's their way of keeping IBM honest, forcing them to provide good, quality service and be competitive.

Microsoft

FROM PAGE 33

for Microsoft's hardware group, who added that other machines are being tested for compatibility.

Microsoft will release a $325 port of its OS/2 Standard Edition 1.0 in the second quarter of this year that is tailored to run with the accelerator board, he said.

Conceding that most users of old 8088-based PCs probably do not want to spend more than $1,000 on upgrades, Abel said Microsoft is bundling the Mach 20, Memory Plus board and Excel for $995.

But Microsoft might have a hard sell when users tally up the total cost of the upgrade. Including the operating system and add-ons, the package costs more than $1,300. And that does not include the cost for such programs as Excel and other hardware upgrades needed to handle the memory-consuming graphics of the OS/2 Presentation Manager.

Ryan

FROM PAGE 35

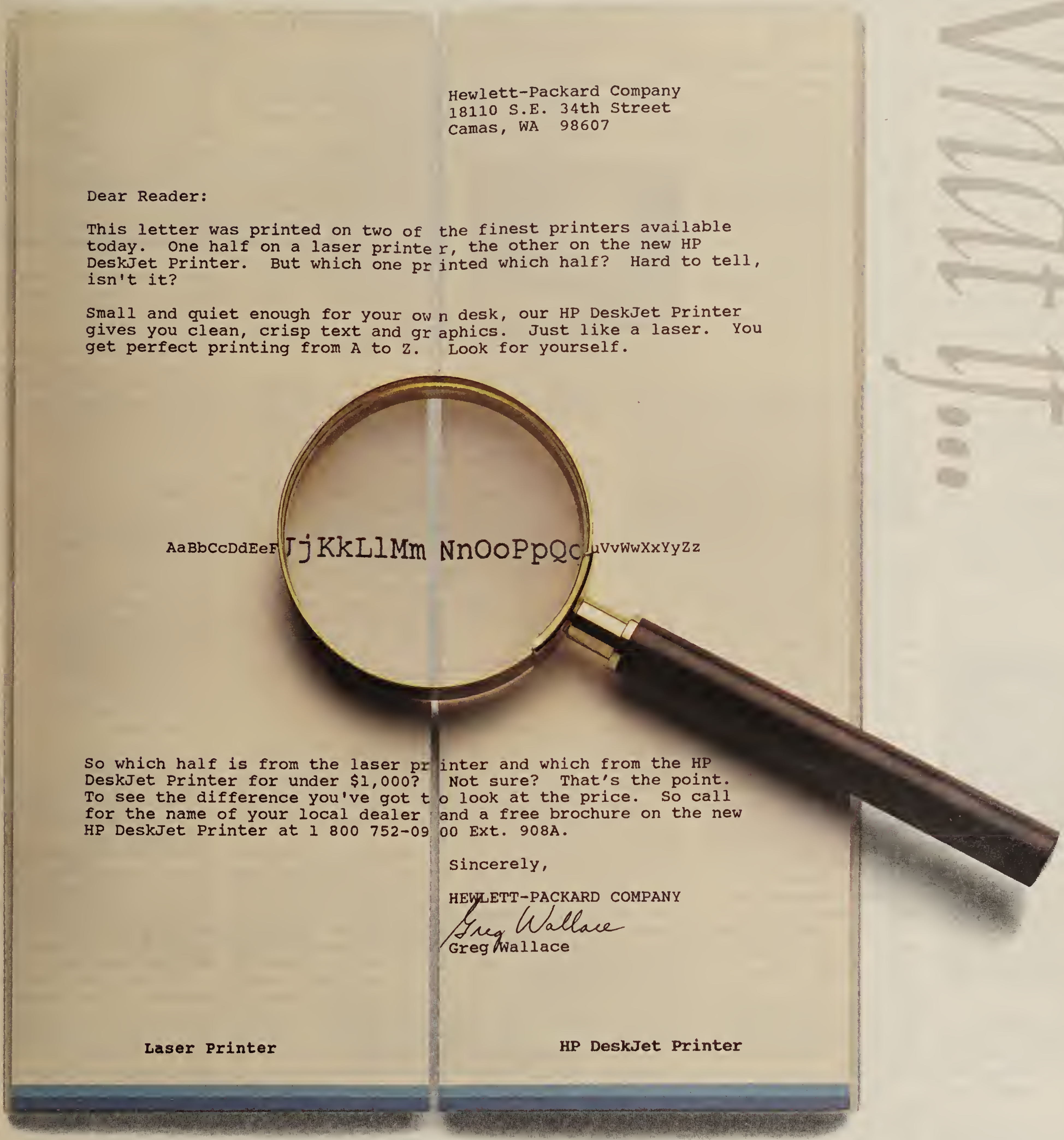
menu-driven interface his department has set up for them, they may still feel the pinch when the serious OS/2 implementation hits the fan. They'll have fewer people to answer DOS users' questions, he says.

In some shops, support costs alone with OS/2 could rise as high as 50% to 60% of the overall implementation price for the first year, predicts Michael Reilly, assistant vice-president of office systems at Metropolitan Life in New York. At first, the operating system will be a challenge for Met Life's applications programmers, who will need additional support.

But even as more and more applications become available (IBM is hoping for 1,000 by year's end), it won't be an easy time to work in MIS. Workers will have to keep a watchful eye on existing MS-DOS applications, noting those programs that work with the new operating system and those that do not.

Ryan is a *Computerworld* senior writer.

If you can see the difference, you must be looking at the price.



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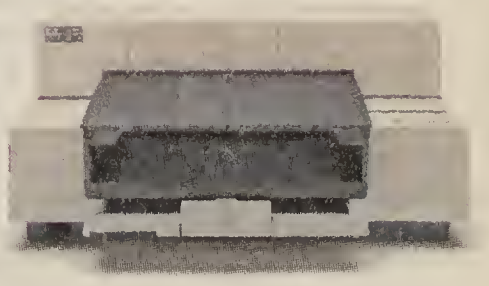

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NEW PRODUCTS

Systems

NEC Information Systems, Inc. has enhanced its **APC IV Powermate 1** personal computer.

Enhancements include software-selectable operating speeds of 8 or 10 MHz, maximum random-access memory capacity of 10.6M bytes and seven expansion slots.

NEC also announced additional data storage options for the Powermate 1, including a 720K-byte 3½-in. floppy disk drive with a 5¼-in. form factor and an 80M-byte 5¼-in. hard drive.

The base Powermate 1 unit, including 640K bytes of RAM, a 1.2M- or 360K-byte floppy diskette drive and a hard-disk controller, costs $1,845.

NEC, 1414 Massachusetts Ave., Boxboro, Mass. 01719. 617-264-8000.

The **Color Layout System**, a design system based on the Apple Computer, Inc. Macintosh II, has been announced by **Lightspeed, Inc.**

Artwork is input using a 300 dot/in. color flatbed scanner. It is then manipulated to fit the designer's layout. Images are combined with Bitstream, Inc.'s Bitstream outline fonts for headline and text, using typographic specifications, adjustable grids and on-screen rulers. Text from other Macintosh word processing packages can be imported in ASCII format.

The *Color Layout System*

The base system costs $17,000, including a Macintosh II, a 19-in. color monitor and software. As a software-only package, the system costs $6,000.

Lightspeed, 47 Farnsworth St., Boston, Mass. 02210. 617-338-2173.

Two fault-tolerant, multiuser multitasking microcomputers have been announced by **Lomas Data Products, Inc.**

The first incorporates dual 10-MHz microprocessors. It features 2M bytes of main memory and supports up to 16 users. The second adds dual 51M-byte hard disk drives. According to the vendor, both personal computers allow access by any terminal user to either CPU, memory or disk drives.

Prices range from $7,394 to $8,550.

Lomas Data Products, 182 Cedar Hill St., Marlboro, Mass. 01752. 617-460-0333.

Sharp Electronics Corp. has reduced the price of its **PC-4501** laptop computer.

The IBM Personal Computer-compatible laptop features a supertwist LCD screen, a 3½-in. disk drive, Genicom Corp.'s Centronics parallel printer port and 256K bytes of memory, expandable to 640K bytes. Options allow users to add a second disk drive, a 300/1,200 bit/sec. modem, a CRT adapter, an erasable programmable read-only memory card, an extended memory card and an external 5¼-in. disk drive.

The PC-4501 now costs $995.

Sharp Electronics, Sharp Plaza, Mahwah, N.J. 07430. 201-529-8970.

Software applications packages

Instant Pages, a desktop publishing program for use with IBM Personal Computers and compatibles and Epson America, Inc. or Hewlett-Packard Co. Laserjet printers, has been announced by **Electronic Arts.**

The menu-based Instant Pages offers what-you-see-is-what-you-get capability as well as such features as bold, underline, double wide, double high and normal text styles; full character set; word wrap; text editor with cut, copy, paste and undo; automatic reformatting; justification; and the ability to read ASCII files from other third-party application programs.

Instant Pages costs $49.95, including a template library.

Electronic Arts, 1820 Gateway Drive, San Mateo, Calif. 94404. 415-571-7171.

SBT Corp. has ported its **Database Accounting Library** to the Apple Computer, Inc. Macintosh Plus, Macintosh SE and Macintosh II.

According to the vendor, the library is the first Macintosh-integrated accounting software to include source code. All programs in the series now run on McMax, data base software from Nantucket Corp.

The Database Accounting Library programs operate independently or as an integrated system. Source code versions available for $395 include Dledger, Dinvoice/Dstatements, Dpayables, Dpayroll, Dassets, Dproject, Dmaterials, Dprofessional, Dproperty and Dmaintenance. Each program costs $295 and includes Dpurchase and Dorders. A main menu and file-backup utility cost $65.

SBT, One Harbor Drive, Sausalito, Calif. 94965. 415-331-9900.

A time and information management software program for use on Microsoft Corp. MS-DOS-based computers has been announced by **Chronos Software Corp.**

Who/What/When cross-references all entries into reports by person, project and date. It can handle an unlimited number of people, resources, projects, subprojects and tasks, according to the vendor. Memos, notes and reports can be attached to records and priorities can be assigned.

Chronos's *Who/What/When*

Who/What/When is priced at $189.

Chronos Software, 1500 16th St., San Francisco, Calif. 94103. 415-626-4244.

Software languages

A natural language-based personal computer software query product has been announced by **Pansophic Systems, Inc.**

Designed to allow users to ask questions in English to retrieve information, **Easytrieve Plus NL** also generates Easytrieve Plus and Easytrieve Plus PC code in response to natural-language questions. It includes an expandable 350-word vocabulary and recognizes synonyms for actual field names. In addition, once the user has requested information, the original question can be adjusted without starting over.

Easytrieve Plus costs $499.

Pansophic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521. 312-572-6000.

An upgraded version of the **Arity/Prolog** programming language featuring an embedded C compiler has been announced by **Arity Corp.**

Version 5 allows users to place C and Pascal language code and declarations directly within an Arity/Prolog program. In addition to the language facilities, other features include a set of screen design predicates for creating windows, pull-down menus and dialogue boxes and built-in data base management.

Arity/Prolog runs on IBM Personal Computers and compatibles. The compiler and interpreter cost $650; the interpreter alone costs $295.

Arity, 30 Domino Drive, Concord, Mass. 01742. 617-371-1243.

Software utilities

A Lotus Development Corp. 1-2-3 add-in that provides the capability to find strings of characters within cells has been announced by **SMI Corp.**

Search-Replace allows users to replace the strings with other strings. The cell can contain labels, formulas or numbers. The search can be done in columns or rows. Cell protection is maintained during a replace, the vendor said.

Search-Replace is priced at $39.95.

SMI, P.O. Box 582221, Tulsa, Okla. 74158. 918-560-9536.

A data entry system for Ashton-Tate Corp.'s Dbase has been announced by **Fox & Geller, Inc.**

Quickentry is a stand-alone product that uses Lotus Development Corp. 1-2-3-style menus to help the user create data entry forms and enter data. It does not require Dbase to run or any knowledge of Dbase to use, the vendor said. Data entry features include carryover fields and a ditto key, password security, 10 types of data fields, browsing, searching and editing of records.

Quickentry costs $99.

Fox & Geller, 604 Market St., Elmwood Park, N.J. 07407. 201-794-8883.

Quires Corp. has announced **Workspaces**, an add-in said to provide Lotus Development Corp.'s Manuscript with multiuser and multitasking capabilities.

Manuscript is a document processor that integrates word processing with symbols, graphics, formatting, printing and data base capabilities. Workspaces organizes information according to tasks for shared or individual use. Features include the ability to create templates, manage directories and files and check the personal computer for memory and storage information. On-line Help is also provided.

Workspaces costs $85. Bundled with Manuscript, it costs $495.

Quires, P.O. Box 940, Niwot, Colo. 80544. 303-530-2744.

Kinetic Corp. has added to its **Kinetic Access** line of security and management systems for IBM Personal Computers.

Kinetic Access II and Kinetic Access II Plus use a menu system to restrict access to the computer, the operating system, individual operating commands and the execution of programs. Kinetic Access II is a software-only product, and Kinetic Access II Plus uses a half card or erasable programmable read-only memory (EPROM) with software to control booting.

Kinetic Microlok is a machine-access-only security system. Kinetic Access Jr. is a menu-only product that lets applications be chosen from a main menu.

Kinetic Access II costs $165; Kinetic Access II Plus costs $175 with EPROM or $195 with the half card. Kinetic Microlok costs $79.95 with EPROM or $99.95 with a half card. Kinetic Access Jr. costs $39.95.

Kinetic, Distillery Commons 240, Louisville, Ky. 40206. 502-583-1679.

Development tools

S & S Systems has released an enhanced version of **Quik/BMS**, its IBM CICS screen-development software.

Quik/BMS runs on a personal computer and automatically generates BMS macro source code for use on a mainframe. The full-screen editor allows users to paint and modify CICS screens, and a review screen provides a view of the CICS screen in IBM 3270 format.

The new release supports CICS 1.7 key words for the mapset definition, map definition and field definition macros. Other features include the ability to generate copybook source code from a painted screen and the ability to create a table from multiple lines of identical fields.

Quik/BMS costs $395.

S & S Systems, P.O. Box 1725, Claremore, Okla. 74018. 918-342-0633.

A Fortran compiler for Intel Corp. 80386-based personal computers has been announced by **Science Applications International Corp.**

SVS Fortran-386 allows users to develop Fortran programs up to 16M bytes in size and run them in the protected mode of the 386 under control of an existing Microsoft Corp. MS-DOS operating system.

SVS Fortran-386 includes a native code compiler, a complete runtime I/O system, a source-level debugger and VM/Run, a 386 runtime monitor. The compiler supports ANSI-standard Fortran 77 as well as some extensions, the vendor said.

SVS Fortran-386 costs $895.

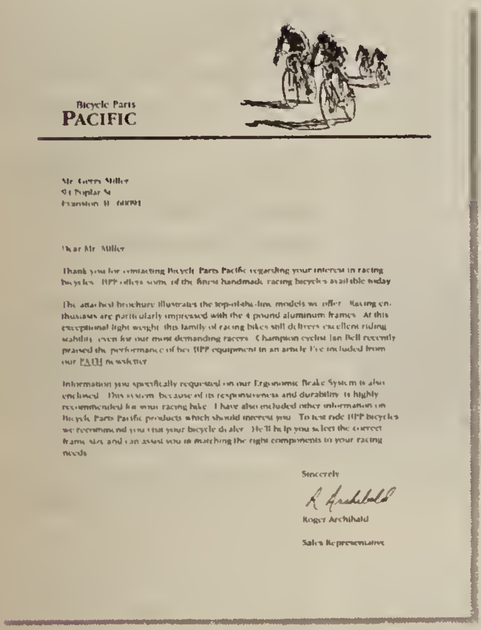
Science Applications International, Suite C-31, 5150 El Camino Real, Los Altos, Calif. 94022. 415-960-3322.

A software development tool for creating cooperative-processing applications has been announced by **Hewlett-Packard Co.**

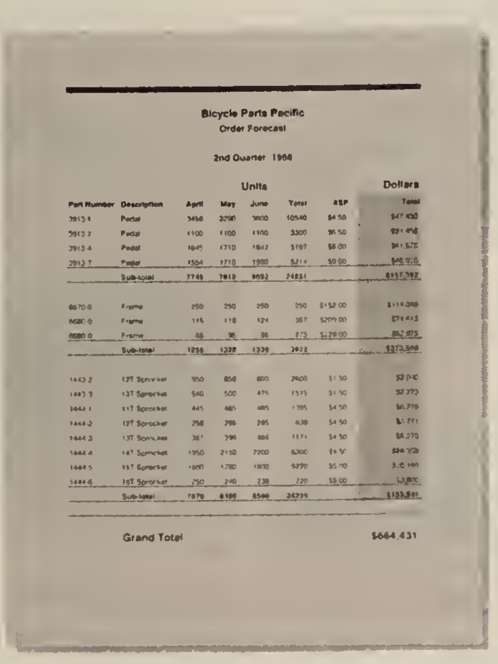
The HP Cooperative Services development tool enables personal computers and

Continued on page 42

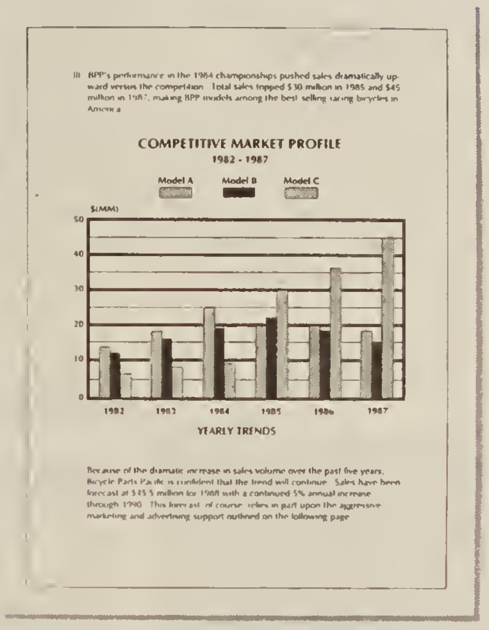
How to look good from start…


Bicycle Parts
PACIFIC

Roger Archibald
Sales Representative


Bicycle Parts Pacific
Order Forecast
2nd Quarter 1988

Grand Total $664,431


COMPETITIVE MARKET PROFILE
1982 - 1987

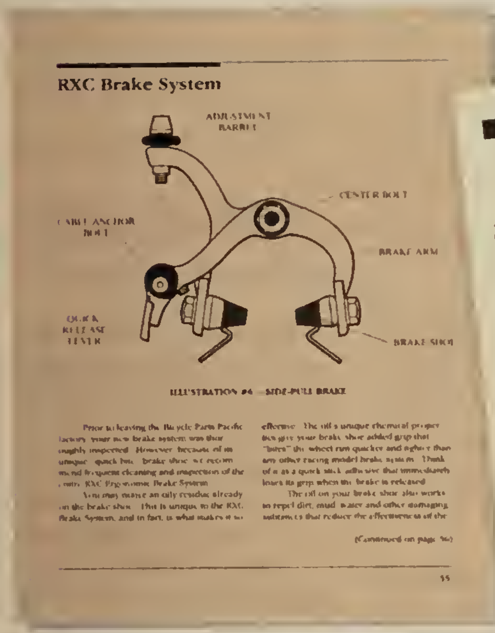
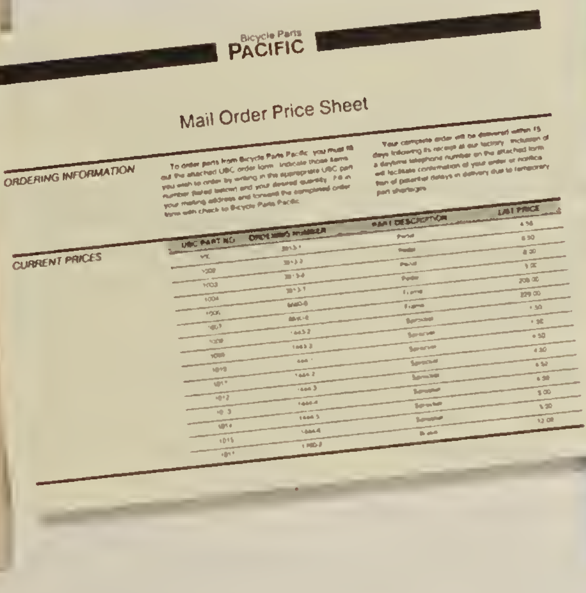

RXC Brake System

ILLUSTRATION #4 — SIDE-PULL BRAKE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BRAZIL	Cathy Lyons Mike Milech

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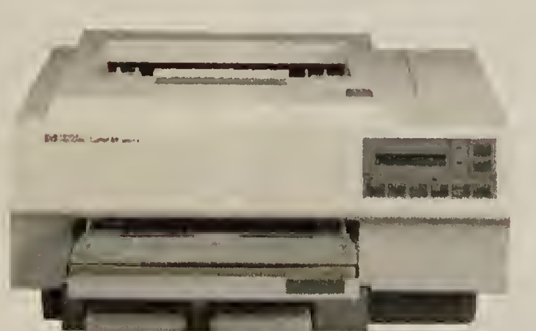

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Print samples were created using Microsoft Word, Microsoft Excel, and Aldus PageMaker

Continued from page 40

HP3000 business computers to process information jointly across a network. According to the vendor, cooperative processing allows software developers to use the power of personal computers in DP applications. The applications can take advantage of such PC features as Microsoft Corp.'s Windows user interface and HP's Newwave applications environment.

The HP Cooperative Services development tool is priced from $2,700 to $8,700.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

Software enhancements

Buttonware, Inc. has introduced **PC-Calc Plus**, an enhanced version of its spreadsheet program for IBM Personal Computers and compatibles.

PC-Calc Plus includes graphing, split screens, DOS access, support for Intel Corp.'s 8087 and 80287 processors, named ranges, sideways printing and a Move command. It also features enhanced printing and formatting capabilities; business, financial, trigonometric, date and time functions; context-sensitive Help screens; and menus.

PC-Calc Plus costs $69.95. Registered users of PC-Calc can upgrade for $25.

Buttonware, Box 5786, Bellevue, Wash. 98006. 206-454-0479.

Rational Systems, Inc. has enhanced its C language incremental compiler, **Instant-C**.

Version 3.0 features medium- and large-model support for C source and object code. According to a spokesman, it provides visual debugging displays throughout the programming cycle as well as advanced syntax checking.

Instant-C Version 3.0 supports common ANSI-standard extensions as well as compilers from Microsoft Corp., Lattice, Inc. and Borland International.

Instant-C Version 3.0 runs on IBM Personal Computers and compatibles. It costs $495.

Rational Systems, P.O. Box 480, Natick, Mass. 01760. 617-653-6194.

An enhanced version of **Viewpoint**, a personal computer project management program and graphics system, has been announced by **Computer Aided Management, Inc.**

According to the vendor, Viewpoint 3.0 supports enhanced graphics adapter graphics in 43-line mode, can be configured for international use and performs up to 10 times faster than the earlier version.

Other enhancements include support for DOS-based local-area networks, support for Adobe Systems, Inc. Postscript devices and Hewlett-Packard Co. HPGL plotters and support for remote plotters on networks.

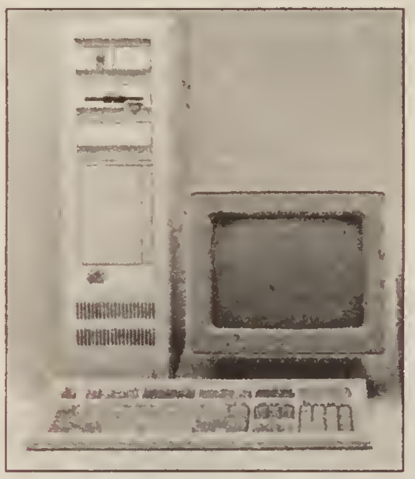
Viewpoint 3.0 costs $1,995. The graphics system costs $995.

Computer Aided Management, 24 Professional Center Pkwy., San Rafael, Calif. 94903. 415-472-5120.

Data storage

A series of tape backup subsystems designed for the IBM Personal System/2 Models 50, 60 and 80 Micro Channel-based personal computers has been announced by **Emerald Systems Corp.**

The quarter-inch PS/2 tape backup products range in capacity from 60M to 150M bytes and can be used in either the DOS environment or with Novell, Inc.'s Advanced Netware 2.0. They feature Emerald Systems' ASP backup software utility.



Emerald *tape subsystems*

The **DOS 60-9107** 60M-byte external model and the **DOS 150-9107** 150M-byte external modem cost $1,995 and $3,295, respectively.

The **DOS 300-11000** features a single chassis containing two 150M-byte tape units. It costs $5,995.

Emerald Systems, 4757 Morena Blvd., San Diego, Calif. 92117. 619-270-1994.

Several mass-storage systems for the IBM Personal System/2 Models 50, 60 and 80 were recently announced by **Priam Corp.**

The **Priam Storagespace** external drives are available for the PS/2 Model 50 in capacities of 45M, 62M and 133M bytes.

The **Priam Innerspace** internal drive is available for the PS/2 Models 60 and 80 in 330M-byte capacity.

Prices for the 45M-, 62M- and 133M-byte systems for the Model 50 are $1,750, $1,950 and $3,920, respectively. The 330M-byte Innerspace drive for the Models 60 and 80 costs $4,540.

Priam also announced a 337M-byte internal mass-storage system for the IBM Personal Computer AT and compatibles. The system costs from $4,890.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134. 408-434-9300.

Printers/Plotters Peripherals

Hewlett-Packard Co. has announced the **HP Color Publisher**, a merged-text and color graphics system for use with HP Vectra personal computers or IBM Personal Computer compatibles.

The package consists of the HP Paintjet color graphics printer, the HP Graphics Gallery collection of presentation graphics software and HP Executive Memomaker word processing software.

The HP Color Publisher costs $2,190.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

An optical mouse designed for use with IBM's Personal System/2 computers has been announced by **MSC Technologies, Inc.**

The **PC Mouse** includes mouse systems drivers that support video graphics array modes and make the mouse compatible with software designed to be IBM mouse-compatible.

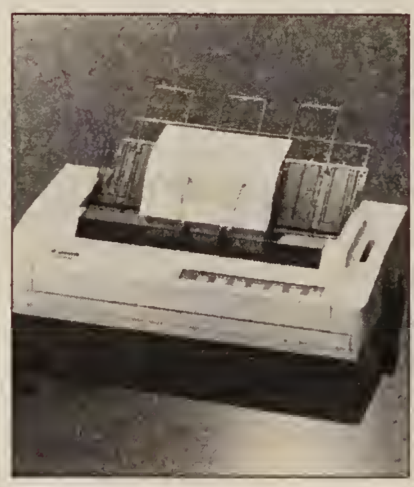
The package also includes MSC's Designer Pop-Up Menus software, featuring a library of menus for third-party business applications and a compiler for creating customized menus.

The PC Mouse for the PS/2 costs $159.

MSC Technologies, 2600 San Thomas Expwy., Santa Clara, Calif. 95051. 408-988-0211.

The **Canon BJ-130**, a plain paper, nonimpact bubble jet printer, has been announced by **Canon U.S.A., Inc.**

The printer features a 48-nozzle print head offering print resolution of up to 360 dot/in. at speeds up to 220 char./sec. It also has a built-in automatic sheet feeder that can handle standard cut-sheet paper or envelopes and an optional tractor assembly that permits the unit to handle sprocket paper up to 15 in. wide. A parallel interface is standard; a serial interface is optional.



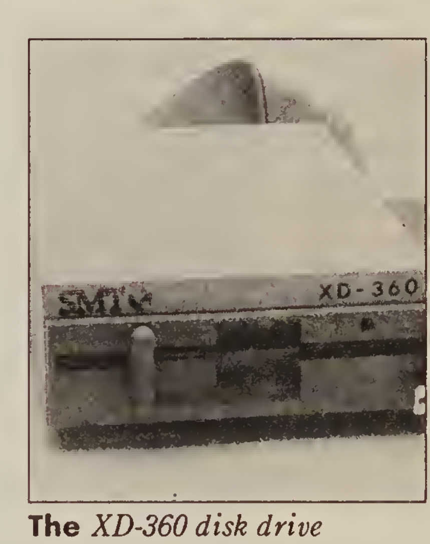
The Canon *BJ-130 printer*

The Canon BJ-130 costs $995.

Canon Printer Division, One Canon Plaza, Lake Success, N.Y. 11042. 516-488-6700.

A 5¼-in. floppy disk drive for the IBM Personal System/2 has been announced by **Systems Manufacturing Technology, Inc.**

The **XD-360** is said to be compatible with the same double-sided, 360K-byte diskettes as those used on the IBM Personal Computer family. It installs via a printed-circuit board cable that is routed internally through the drive B connector to the rear panel and into any available slot.



The *XD-360 disk drive*

The XD-360 supports IBM PC-DOS 3.3. It costs $325.

Systems Manufacturing Technology, 1145 Linda Vista Drive, San Marcos, Calif. 92069. 619-744-3590.

Board-level devices

An IBM Video Graphics Array-compatible graphics controller for IBM Personal System/2 Models 50, 60 and 80 has been announced by **Galagraphics Ltd.**

The **Galaxy Mercury/2** two-card controller uses the IBM Micro Channel 16-bit parallel bus. Features include instant zoom, software selectable resolution of 1,024 by 768 or 800 by 600 lines and up to 256 simultaneous colors from a palette of 256,000.

The product costs $2,495.

Galagraphics also announced the **GS-1280** and **GS-800**, IBM Personal Computer AT-compatible graphics boards with dual Intel Corp. 82786 graphics processors, zoom windows and high-resolution color support. The boards cost $3,195 and $2,495, respectively.

Galagraphics, 1568 Ocean Ave., Bohemia, N.Y. 11716. 516-563-1320.

A unit designed to allow any single expansion card to be mounted on the bottom of Toshiba America, Inc.'s T1100 Plus and T1200 portable computers has been announced by **Connect Computer Co.**

The **Wonunder** is a metal card carrier that mounts on the bottom of the computer and an interface card that plugs into the computer's expansion port. Most standard 8-bit personal computer expansion cards of two-thirds length or less can be used, the vendor said. Cards supported include network interface cards such as Ethernet, Arcnet, Proteon, Inc. and Starlan cards, modem cards and mainframe terminal-emulation cards.

A basic Wonunder package costs $349. With an Arcnet expansion card, it costs $629. With an Ethernet expansion card, it costs $779, and with a CXI, Inc. IBM 3270 terminal emulation board, Wonunder costs $1,195.

Connect Computer, 9855 W. 78th St., Eden Prairie, Minn. 55344. 612-944-0181.

Auxiliary equipment

Automated diskette duplicators for use with the IBM Personal Computer, PC XT, AT or compatibles have been announced by **Autofax Corp.**

The **AFX5251** is a 5¼-in. version and the **AFX5253** is a 3½-in version. Both are capable of duplicating 60 diskettes per hour. They feature 30-diskette I/O hoppers; optional 100-diskette hoppers are available. Software that allows duplication of 120 diskettes per hour is also available.

The systems cost $2,745 each.

Autofax, 4113-A Scotts Valley Drive, Scotts Valley, Calif. 95066. 408-438-6861.

Thumbscan, Inc. has announced the **Boot** family of security access products for personal computers.

PCboot and Lanboot restrict access to individual PCs or local-area networks. Dealerboot adds a timing capability that allows dealers to enforce trial periods for hardware and software.

PCboot and Lanboot prevent unauthorized users from initializing or booting the PC; using software application programs such as Lotus Development Corp.'s 1-2-3; accessing data, files and template programs; and gaining access to system resources such as disk drives and serial ports.

PCboot costs $179.95; Lanboot costs $379.95.

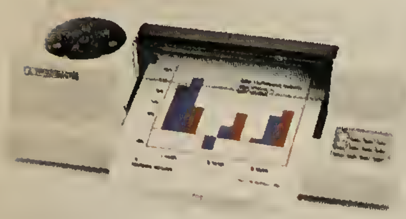
Thumbscan, Suite 800, Two Mid-America Plaza, Oakbrook Terrace, Ill. 60181. 312-954-2336.

International Battery Corp. has introduced lithium computer replacement batteries for Intel Corp. 80286-based IBM Personal Computer XTs and Personal System/2s.

The **Model BR-P2** battery is a six-volt unit that measures 19½ by 33.9 by 36mm. It is made from nontoxic material and is user replaceable. It has a shelf life of 10 years when stored at room temperature, the vendor said, and is guaranteed to last two years during normal computer use conditions.

The Model BR-P2 costs $25.

International Battery, #113, 6860 Canby Ave., Reseda, Calif. 91335. 818-609-0516.



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At under $1,300, the HP ColorPro Plotter may be just where you want to start. It will turn your ideas into colorful, easy-to-grasp visuals. Or, if you need to combine near-letter quality text with color graphics, you can rely on the HP PaintJet Color Graphics Printer for under $1,400. Whichever you choose, you'll create desktop presentations with startling color and greater impact.

For a colorful sample overhead and the name of your nearest dealer, call 1 800 752-0900, Ext. 903A.

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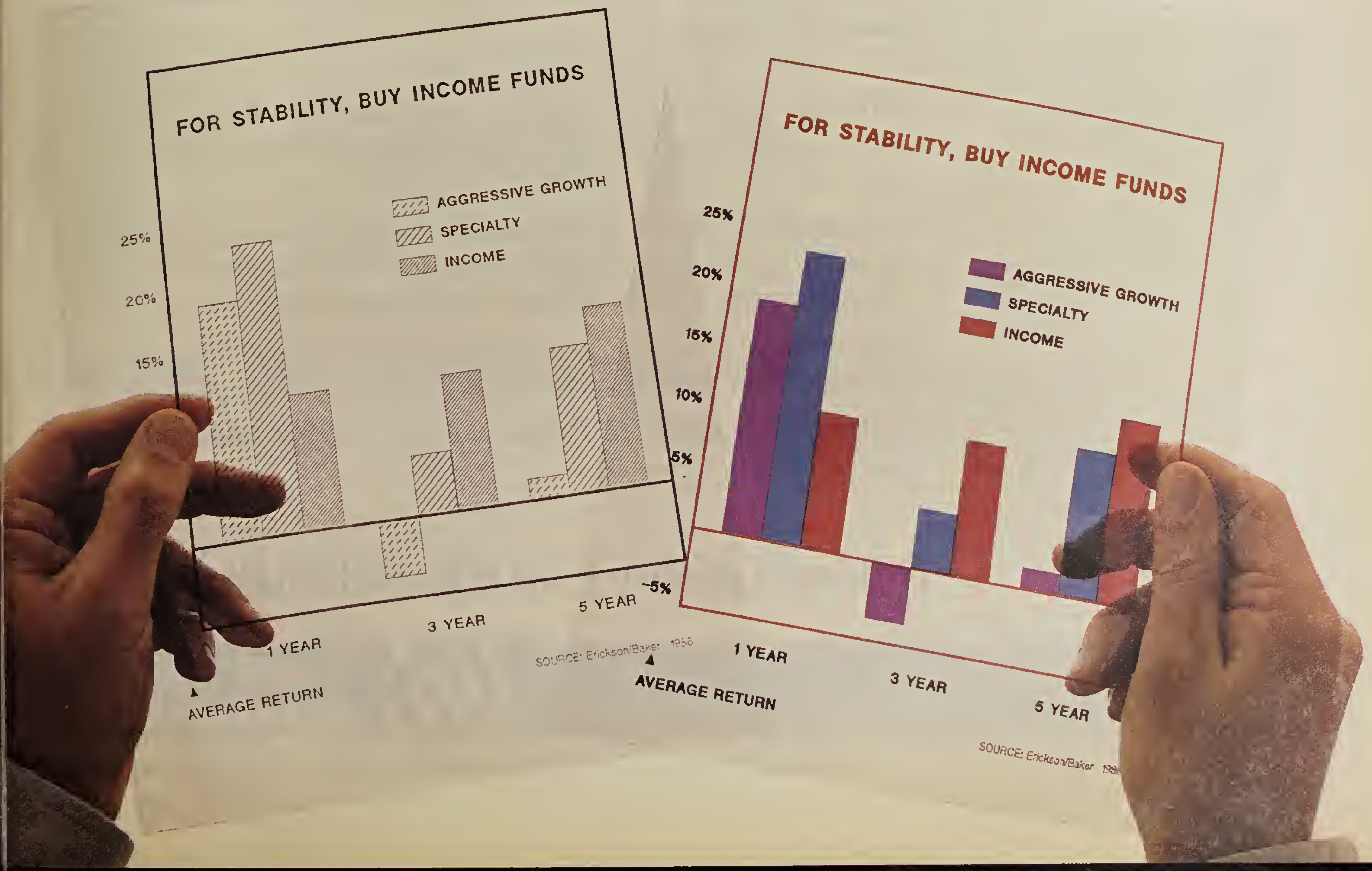
Guess which presentation made the sale.



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DATA
STREAM
Patricia Keefe

MIS tangled up in nets

There's nothing like a little communication to keep data processing flowing smoothly. And I don't mean bandwidth and modems. The stress here is strictly on the interpersonal link, whether face to face or via direct dial-up.

Unfortunately, MIS can get so consumed with building good rapport with management and user departments that conversation between the various DP, applications development and communications units falls by the wayside. This does not bode well for system health.

It used to be that MIS managers worried about users' surreptitiously installing small work group networks or buying into different personal computer standards. Most of these squabbles have been laid to rest with the help of corporate edicts on approved standards, buying policies and formalized support organizations.

But as necessary as these tactics are, they are not enough to prevent serious system degradation and related crises in companies that have embraced corporatewide networking.

Political battles about whether communications managers should report to MIS directors are not the issue. The fact is, these managers need to work together today more than ever.

Continued on page 54

Net management help wanted

Firms waiting for standards seek aid for multivendor systems

BY ELISABETH HORWITT
CW STAFF

The past few months have seen a spate of activity from vendors that target two types of network management customers: companies that want better tools to help them manage their own multivendor networks and firms that want someone else to manage their networks for them.

There is a much clearer demand in the first area than in the second, according to Jeremy Frank, program director of enterprise network strategies at the Gartner Group, Inc. "Companies want someone to give them tools, help them set up the system and get it running — then back out and provide maintenance if necessary."

As a former employee at AT&T regional holding company Pacific Telesis Group, Frank worked on several joint bids with Pactel Spectrum Services, a subsidiary offering network monitoring, restoral and inventory maintenance services on its own system. Spectrum's refusal to sell the system commercially lost it some customers, Frank said. "Fewer and fewer companies want to give up control of a network they perceive as a strategic edge."

Proceed with caution

Pactel Spectrum's experiences are "certainly a warning to us," admitted Philip F. Otto, president and chief executive officer of network management services vendor Netline Communications Corp. in San Mateo, Calif. "But we think [Spectrum's troubles are] more a managerial than strategy issue, and they have regulatory constraints that don't apply to us."

Spectrum, for example, cannot offer to manage networks that stretch across different divested Bell operating companies' local access and transport areas, Otto pointed out. Founded in January, San Mateo-based Netline plans to offer network management services similar to Spectrum's later this year.

Another recent entry in the network management services arena is EDS Communications Corp., a division of Electronic Data Systems Corp. established in 1986. The company will develop a network, then turn it over to the customer or manage it from EDS facilities, noted the company's vice-president, Peter Fitzgerald.

Fitzgerald predicted strong demand for his firm's services among Fortune 1,000 companies bewildered by the technological complexity of the postdivestiture networking market. However, he was only able to

Continued on page 53

Financiers look at OSI standards

BY ALAN ALPER
CW STAFF

NEW YORK — A group of financial services companies have formed an organization to define data processing and communications standards for their industry, using the seven layers of the Open Systems Interconnect (OSI) model as a starting point to describe industrywide requirements.

Called FISO, Inc., the group's intent is to bring a modicum of consistency to the way financial services companies process data and communicate, not only within their own businesses but also in their dealings with external information suppliers. "The only standard in the business now is that everyone does everything differently," said David Isherwood, a cofounder and assistant vice-president at Shearson Lehman Hutton, Inc.

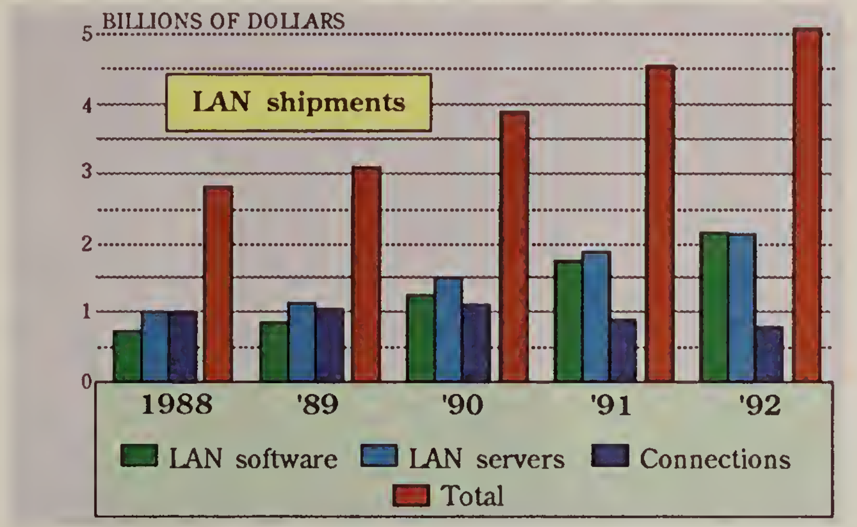
Industrywide standards would enable MIS departments to accelerate applications development because programmers will be able to focus their efforts on code, not technology, accord-

Continued on page 53

Data View

LAN buying trends, 1988 to 1992

Dollar value of connections going down; servers and software on the rise



INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.
CW CHART

Overseas fiber link cuts costs

BY KATHY CHIN LEONG
CW STAFF

MENLO PARK, Calif. — Raychem Corp., a $944 million producer of industrial alloys, plastics and polymers, is anxious to see its communications costs drop once it gains access to the new AT&T TAT-8 transatlantic fiber-optic cable in December.

Raychem and other companies, such as Eastman Kodak Co. and Visa International, Inc., are queueing up for the right to use the additional bandwidth and

Continued on page 54

Inside

- 10Net moves toward OS/2 with unbundled LAN software for IBM nets. Page 48.
- Interlink, Oracle join to provide distributed DBMS links between DEC, IBM systems. Page 52.
- American Network Connections unveils direct connection device. Page 56.

Siemens, DEC to enhance Bell nets

BY ELISABETH HORWITT
CW STAFF

Continuing its efforts to invade the telecommunications marketplace on several fronts, Digital Equipment Corp. recently announced an agreement with Siemens USA subsidiary Siemens Communications Systems to cooperatively develop systems that will implement enhanced services on local telephone companies' networks.

The companies will work on a nonexclusive basis to integrate Siemens' central office switches with DEC's computer equipment.

The resulting systems will allow a divested Bell operating company's network to provide the same capabilities as are available on a local- or wide-area network, said Richard Blake, vice-president of strategic planning at Siemens.

The partners will also work to develop new protocols and services that operating companies can provide through Integrated Services Digital Network standard interfaces and under Open Network Architecture regulations laid down by the Federal Communications Commission, he added.

The integration of voice and data applications "has been slow to take place but has been identified as the fastest growing area in the computer field," said Bart Stuck, vice-president of Probe Research in Morristown, N.J.

Widespread use

The linking of computer applications with private branch exchanges and central office switches serves telemarketing groups, insurance and financial service representatives — any job that requires calling up information while talking to someone on the telephone, he added.

DEC already has agreements with all seven regional Bell holding companies to implement VAXs as data base servers at regional telephone company sites, Stuck said. Such systems are currently used to keep track of routes and destinations for an 800 number service, but "will grow to pick up a lot of other applications," Stuck said.

For example, a VAX at the central office could be programmed to configure a customer's network to support terminal-to-host links during business hours and batch-file transfer at night.

DEC also has signed up Siemens, Northern Telecom, Inc. and L. M. Ericsson, Inc. to integrate their PBXs with the VAX under DEC's Computer Integrated Telephony program.

DEC's rivals are also working hard to integrate their systems with those of telecommunications vendors, however. IBM has announced statements of direction to integrate its computers with Siemens and Ericsson's central office switches, according to Stuck. And Data General Corp. is jointly developing intelligent switches with Japanese carrier NTT.

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Paul Abeln
Technical Support Specialist

Susan Schaefer
Senior Account Manager

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Survey says net managers will see more complete nets in '88

NEW CANAAN, Conn. — Frustrated MIS managers who have vainly petitioned their vendors for more integrated, comprehensive and open network management will get their wish with the next generation of products, according to a recent report by International Research Development, Inc. (IRD).

According to the report, many corporations have held off from implementing companywide network management systems because currently available products lack key functionality. Users are increasingly pressuring vendors to provide the following:

- Monitoring and active control of all network elements.
- The ability to heal, bypass or circumvent failed network elements as automatically as possible.
- Improved user interface features, such as nonduplicative reporting of fault conditions.
- Statistics and historical operating data automatically saved in a standard data base format, such as SQL, with vendor-provided tools for users to develop their own analysis formats and other output.
- The capability to monitor and diagnose unsatisfactory conditions in systems and application software, rather than just in hardware.

Shocked into action

Although current products do not meet the above needs satisfactorily, vendors have been galvanized to provide those functions in future products, IRD said.

IBM, for example, reportedly has more than 200 people — as opposed to 44 people five years ago — working on upgrades to its Netview host-based network management system and the Netview/PC interface. Netview upgrades within the next three years should provide several features, including the following:

- Two-way message and command formats for reconfiguring non-IBM network elements through Netview/PC.
- Standardized fall-back or circumvention techniques for networking equipment.
- Designation of separate paths for network management system communication, in case of a network failure.
- Rewriting of Netview software components to improve formats for statistics collection and reporting.
- Greater functionality in Netview.

Network management system revenue should jump from $600 million last year to at least $700 million this year, the report stated.

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10Net cozies up to IBM net users

BY JAMES DALY
CW STAFF

DAYTON, Ohio — 10Net Communications took a step closer to OS/2 integration with the recent announcement of a Netbios-compatible unbundled version of its 10Net local-area network software for use on the IBM Token-Ring and PC networks.

Parent company Digital Communications Associates, Inc. is expected to release a statement of direction on OS/2 later this month, which should also address 10Net's plans.

"Because we're Netbios-compatible and support the Server Message Block protocols that IBM says can operate with the OS/2 server code, you can have the IBM PC LAN program running on the workstation or the 10Net software running on the workstation in the DOS environment interoperating with the OS/2 server," 10Net President Greg Goodall said.

A real cream puff

Goodall added that the unbundled software provides another alternative to the PC LAN program. "If the IBM PC LAN program is the Chevrolet of the Token-Ring PC network software, 10Net is the Cadillac software module," he said.

However, users already have several other "Cadillac" models to choose from, most notably Novell, Inc.'s Advanced Netware, 3Com Corp.'s 3+, Banyan Systems, Inc.'s Virtual Networking Software, or Vines, and other network operating systems. Novell has the strongest grip on the departmental network market, but Goodall claimed the only entrenched vendor is IBM.

The unbundled version will contain an enhanced version of the 10Net operating system software, electronic mail and caching modules as well as the multiuser calendaring, print spooling, user-to-user communications, broadcast communications and remote job submission software used in the bundled product, according to the vendor.

The unbundled version will cost $395 per node and is slated for delivery next month, 10Net said. Current 10Net users will be able to upgrade for $195 per node, and the bundled product will continue to sell for $695 per node, according to the vendor.

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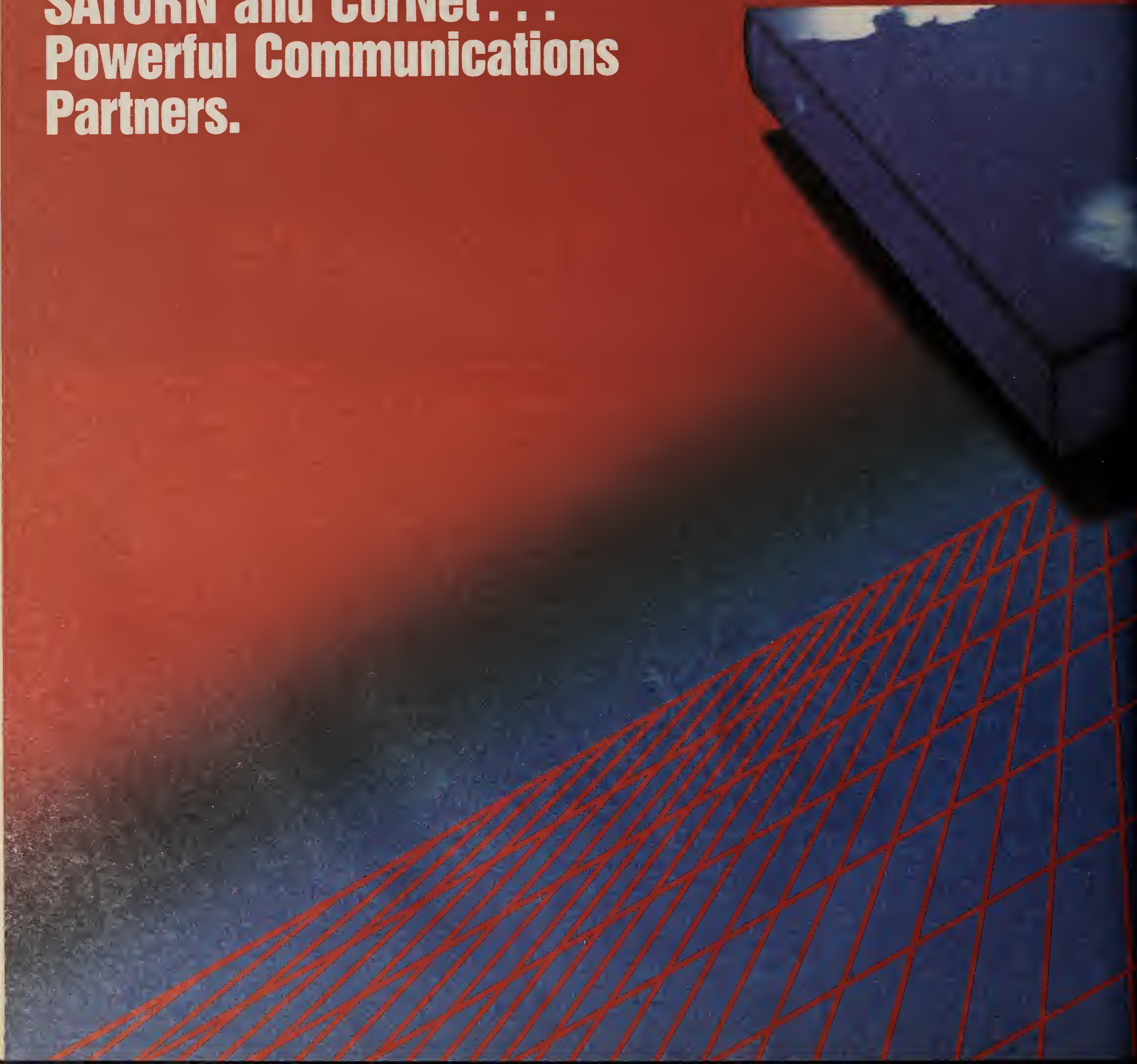

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BIT BLAST

3Com file server roars past Compaq model in benchmark

3Com Corp.'s Intel Corp. 80386-based dedicated file server, the 3+ 3Server3 Model 3S/400, outshone a similarly configured server from Compaq Computer Corp. in recent benchmark testing conducted by The Lanquest Group. 3Com's Model 3S/400 ran word processing, spreadsheet and data base applications an average of 25% faster than a Compaq Deskpro 386/20, test results showed. The suite of applications used included Microsoft Corp.'s Word, Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s Dbase III Plus and Innovative Software, Inc.'s Smart LAN Performance Test.

The Massachusetts Corp. (Masscomp) has agreed to become an OEM of Community, **Technology Concepts, Inc.'s** implementation of Digital Equipment Corp.'s Decnet for Unix computers. Community for Masscomp's 4,000-plus systems is scheduled for summer availability.

Micom Systems, Inc. is manufacturing an asynchronous emulation adapter for IBM's 3174 control unit. The adapter is the result of hardware and software development efforts by Micom and IBM's Communication Products Division under a prior agreement. Product shipments began last December.

Rumors of the private packet-switching market's demise are premature, according to a recent report by **The Yankee Group**. The Boston-based research firm predicted that sales of packet-switching equipment conforming to the CCITT X.25 protocol will grow 25% domestically and 30% internationally from 1988 to 1992, reaching $1.4 billion in total revenue during that time frame.

Competitive T1 and Integrated Services Digital Network technologies will support and augment, rather than reduce, the implementation of private packet-switching networks, according to the report.

Communications Solutions, Inc., a San Jose, Calif., vendor of IBM-compatible communications software, has published the first issue of a network management newsletter. The February issue of "Network Management Perspective" includes articles on voice/data integration, the International Standards Organization's Open Systems Interconnect protocols, product evaluations, AT&T's Unified Network Management Architecture and IBM's Systems Network Architecture Management Services. Subscription rates are $350 for one year and $520 for two years.

Apollo Computer, Inc. has signed an agreement to purchase **Ki Research** products that it claims will allow Apollo workstations to transparently access files and programs on Digital Equipment Corp. VAX/VMS hosts via Decnet communications protocols. Apollo already offers links between its computers and DEC VAX/VMS hosts.

Atlantic Microsystems, Inc. in Salem, N.H., has signed an OEM agreement to provide **3Com Corp.** in Santa Clara, Calif., with products designed to provide fault-tolerant qualities for 3Com file servers.

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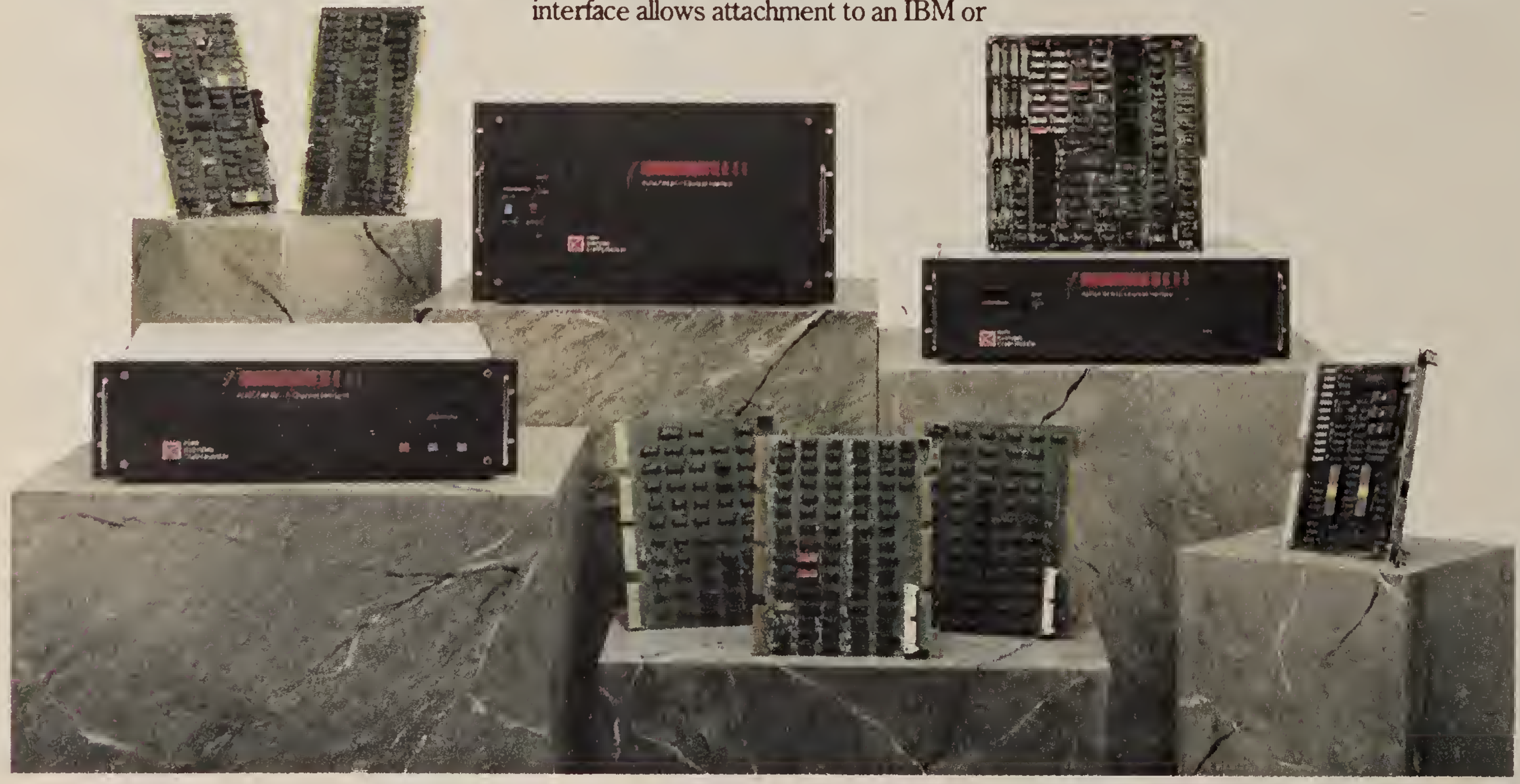

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Firms join to link IBM, DEC

Interlink Computer Sciences, Inc. in Fremont, Calif., and Oracle Corp. in Belmont, Calif., have entered into a joint marketing and cross-certification program under which the firms will cooperate in providing distributed data base management system links between Digital Equipment Corp. and IBM systems.

The joint effort was designed to make it easy and efficient to marry data bases and applications between DEC and IBM computers, according to an Interlink spokesman.

Under the agreement, Oracle and Interlink are certifying interfaces to one another's products; for example, allowing Oracle SQLstar users access to DEC equipment and IBM mainframes. They will also reportedly cross-certify each other's products for interoperability, exchanging information to assure continued upward compatibility.

A version of Oracle's SQLstar that runs between DEC VAXs and IBM mainframes running VM using Interlink's Advanced Gateway for the VM environment is currently in limited release and will be generally available in April. An IBM MVS-compatible version will be released during the summer, the vendors said.

Interlink's Advanced Gateway products and Oracle's Oracle DBMS connectivity products will be cross-promoted, and each vendor's sales staff will be cross-trained, the companies said.

Net management

CONTINUED FROM PAGE 45

cite two current EDS Communications customers: General Motors Corp. and Unilever N.V.

Demand for network management development tools has been showing signs of life only recently. One of the market's earlier players, Avant-Garde Computing, Inc., went through nine consecutive quarters in the red and then witnessed a major retrenchment that included taking its two flagship products off the market. "We bit off a lot, trying to do everything people wanted on a case-by-case basis," Avant-Garde director of communications Roger Green said.

The company has since reintroduced its network management system in a more standardized form and has begun focusing on automating network management operations for companies with limited technical staff. Its last two quarters were profitable.

Help wanted

"We are absolutely looking at third parties to help us develop our network management system," said Alan Chase, manager for research and technical planning at Eastman Kodak Co. "We have found a whole kludge of pieces out there but few acceptable products, and none of it fits together." The firm is considering companies like EDS, Boeing Computer Services Co. and AT&T to help it design various pieces and make them work together.

Telwatch, Inc. in Boulder, Colo., has spent almost three years helping American Express Travel Related Services Co. develop a communications control center that does trouble ticketing, inventory, real-time monitoring and data base searches for performance analysis. "Three years ago, no one product was covering all the bases," even for one vendor's product line, and the subsidiary needed to manage a broad range of networking equipment, communications operations manager Glenn Caldwell said. "Now network management is hot, but I still haven't seen a commercial product comparable to ours, and a lot of other businesses are scrambling to catch up with us."

Mitre Corp. in Bedford, Mass., is evaluating Command Technologies, Inc.'s VXM Network Shell as a way to generate a common set of applications for managing and monitoring multivendor networks. One VXM feature that caught Mitre's interest was the "Softrobot" concept: intelligent command scripts that can be sent out over a network to initiate jobs on a variety of systems, according to Mitre technical staff member Vivian Sovinsky. A prototype program that Command Technologies reportedly developed for Mitre in two hours collects network statistics from Bstat, a program that generates network performance statistics on Excelan, Inc. LANs.

"I told Command that we couldn't buy VXM unless it could run on a [Transmission Control Protocol/Internet Protocol] network, and it only took them a couple of weeks to do it," Sovinsky said.

Mitre is also heavily involved in the TCP/IP network management standards effort, but this will only define formats for exchanging network data — "which doesn't rule out VXM" as a viable system, Sovinsky said.

Indeed, third-party vendors seem determined to have their products complement solidifying standards. Telwatch, for example, plans to provide links to IBM's Netview and possibly AT&T's Unified Network Management Architecture for equipment that does not yet support the de facto standards, according to the firm's CEO, James Edwards. "We also think there is a large window before ISO and ISDN standards are fully functional. And we will continue to provide what the big players don't have," Edwards said.

Financiers

CONTINUED FROM PAGE 45

ing to Isherwood.

Information suppliers and vendors would also benefit by not having to customize solutions for financial services companies, a common and costly occurrence, he added. The organization hopes to have a set of standards agreed upon by year's end, Isherwood said. "There may be two or three acceptable solutions, and there may be no reason not to bless all three."

An industry first

FISO will first define the unique requirements of the financial services marketplace in terms of the OSI model and then scrutinize the work of other cross-industry standards bodies, he said.

Although it is open to adopting preexisting standards that are germane, the group expects to adopt many of its own standards. "In the financial industry, there are some nuances," Isherwood said. "We have a lot of broadcast-type data, and I'm not aware of anyone doing work on broadcast standards."

So far, FISO consists of 17 member companies, although 130 organizations have expressed interest in joining the group. Members and interested parties include hardware vendors AT&T, Digital Equipment Corp., IBM, Stratus Computer, Inc. and Sun Microsystems, Inc.; information services suppliers, including Quotron Systems, Inc. and Automatic Data Processing, Inc.; the stock exchanges; the Securities Exchange Commission; and the Commodities Futures Trading Commission.

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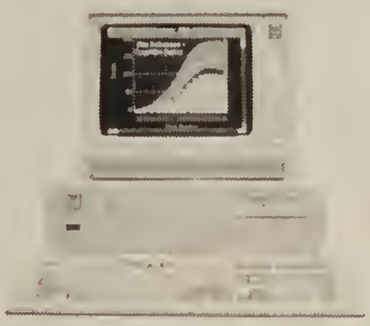
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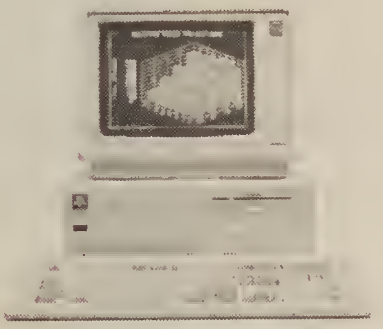
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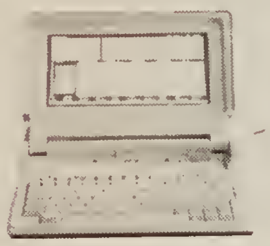
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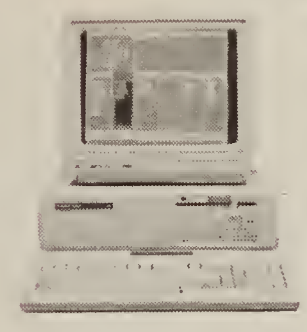
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Keefe

CONTINUED FROM PAGE 45

Computers and communications are being so tightly coupled that you can't just look at half of the equation anymore. Nowhere is this more obvious than in corporate networks and network management systems.

The current crop of network management systems pretty much sticks to the fundamentals, answering questions such as "What's my error rate?" and "Is my modem working?" This is all fine and well — network managers need to know these things. But increasingly, users need to know more. They need to know, for example, how changing applications on a computer system will impact services on a corporatewide network.

As an example of how an innocent change on one side of the house can trigger systemwide ripples, consider the following situations:

- An applications programmer made a slight change to improve the look of the screen. Unbeknownst to him, that change required an extra packet every time a message was sent, hence doubling the volume of message-related packets on the network. "The poor guy had no idea; he just saw the costs go crazy," says John McConnell, an analyst with Infonetics.
- A file server supported 15 users comfortably until a power user decided to upload a sophisticated, resource-hungry application. The server struggled to handle the load, and suddenly, the network slowed to a crawl.
- A decision is made to bridge two local-area networks to provide electronic mail capability to one of the LANs. An undesirable by-product of this bridge, however, turns out to be indirect host access for those same users, creating a potentially serious data security problem.

These situations came about because the people involved failed to consider that their systems are highly interdependent in terms of performance. It helps to look at networks as a system, just like mainframes, rather than as PCs with peripheral cards, observes Mark Freund of network consulting firm Interconnect.

"A lot of people are asking, 'How can I manage all of this?' " says McConnell. He says decision makers need network management systems that do two things: build tools for decision support and provide environmental management or, more specifically, include the computer system as part of the structure to be managed. Theoretically, this environmental approach would enable a network manager to isolate a problem as a function, perhaps, of the application mix on the network, as opposed to a communications failure of some sort.

With the advent of networks as a desirable, if not expected, component of corporate systems, users and systems personnel alike will have to face up to the need to take better notice of the effects of their actions on the overall system.

Keefe is a *Computerworld* senior editor, networking.

Overseas fiber

CONTINUED FROM PAGE 45

services that will be provided on the TAT-8 fiber link, which will directly connect the East Coast and Great Britain, providing linkages to Canada and France.

The cable link will be constructed and maintained by AT&T, British Telecommunications Inc., the French Telecommunications Administration and Teleglobe Canada.

Attractive economy of scale

Howard Westbrook, Raychem's U.S. international corporate manager of computers and communications, would not estimate how much the company stands to save, since he is still negotiating other contracts with network vendors that will affect overall costs. However, he did say that TAT-8 provides "an economy of scale that is very attractive."

Westbrook said Raychem has signed a three-year agreement with France Telecom for one 56K bit/sec. leased line. Westbrook said the company is considering MCI Telecommunications Corp. to handle the U.S. portion of the fiber connection. "We need to be as flexible with our vendors as possible. Customers want quality service. It can be two cans on a string as long as they get that quality," he said.

Meanwhile, Raychem is working closely with France Telecom to make sure the portion of its fiber line that goes to France and England will work smoothly.

The fiber-optic link will provide an alternative for global network users whose choices are now limited to terrestrial analog lines or satellite. The fiber link will support digital communications, reportedly providing clearer signaling than analog links. But unlike satellite connections, the undersea medium does not generate transmission delays, which are said to make it hard to use some protocols, such as IBM's Systems Network Architecture.

A typical three-year fiber contract for one 56K bit/sec. line with France Telecom is estimated to cost about $4,100 a month, according to Nicole Toomey, assistant manager of international services. In many cases, one leased 56K bit/sec. fiber line provides significant cost savings over three separate 19.2K bit/sec. analog lines to an overseas destination, she noted.

As an international company with data centers in California, England, France and Germany, Raychem expects to lease one 64K bit/sec. fiber channel from California going to England, which will replace two 9.6K bit/sec. lines, Westwood said. Another 64K bit/sec. channel will go to France from California.

The greater bandwidth gives Raychem the potential of doubling its data traffic, according to Westbrook. Future plans include transmitting both facsimile and voice across the fiber link, he added.

Speedy delivery

The cornerstone of data delivery at Raychem is the Transaction Delivery System (TDS), an internally written application that supports four different operating systems and allows Burroughs Corp. and IBM hosts and Personal Computers talk as though they were peers on the network.

A year in development, Raychem said TDS lets users write files into a mainframe data base and send files to other users on the network.

When the fiber network connection is activated at Raychem, the TDS application will be able to run uninterrupted and will enable Raychem to bring more users onto its customized electronic mail network. Running on the fiber network, the application is expected to save on the costs of telexes and overnight mail packages.

"The fiber plans are coming along slowly," Toomey said. "We are taking our time, and there's still much to do."

After the fiber network is laid down and ready for testing in September, Raychem said, it will have its network traffic deployed over the fiber line by December.

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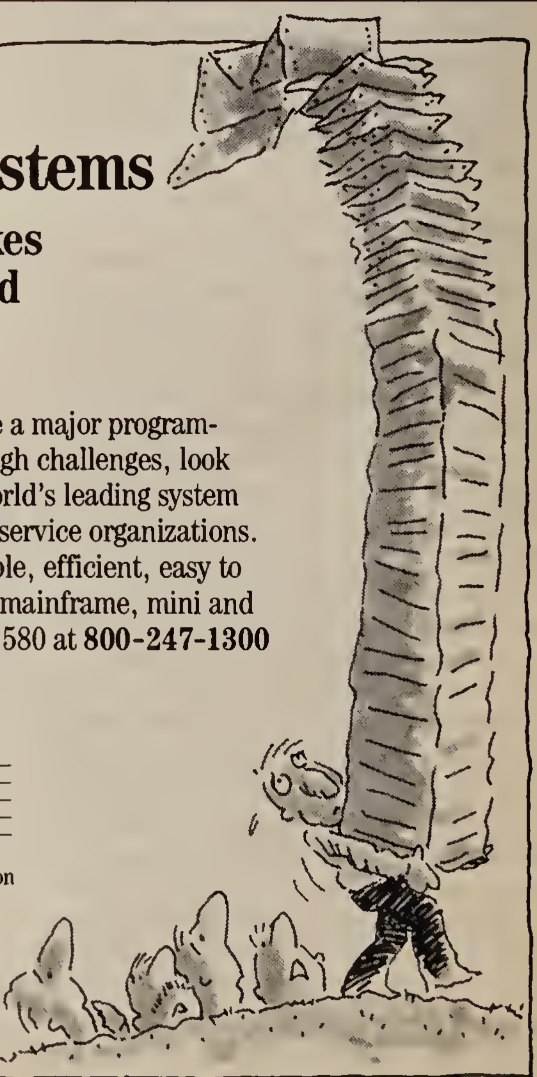

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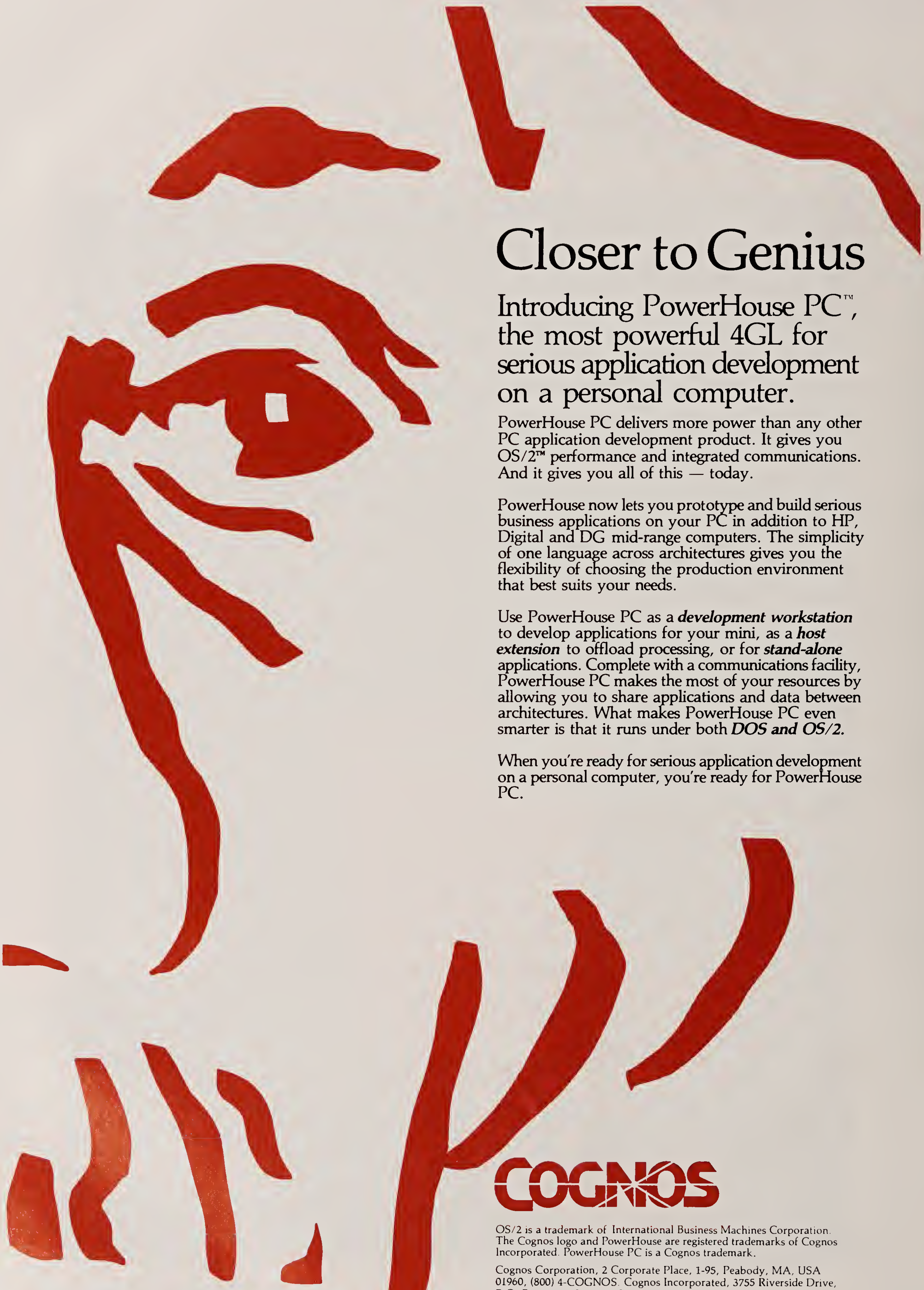

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INSIDE

Old Faithful

Hierarchical DBMS's loyal users see relational as a technology not mature enough to run transaction-intensive tasks. Page S3.

Synchronicity

While their needs may be different, micro users all seem to look for the same thing in a DBMS. Page S6.

Policy Differences

Among micro relational DBMS vendors, strategic varieties exist that could affect users. Page S7.

Ask the Vendor

Vendors respond to questions about SQL support and DBMSs on workstations. Page S8.

A Different Angle

Picture data bases offer a different way to look at tracking information. Page S8.

Definitive Data

Data dictionaries are key to multivendor integration, but not all dictionaries are alike. Page S13.

Of Different Tongues

A place needs to be made for semantic elements in DBMSs. Page S14.

Product Charts

A detailed guide to relational data base management systems. Page S9.

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Distributed DBMS holds promise for decentralized firms, but this budding technology has yet to reach its potential

DATA DISPERSAL STARTS AS TRICKLE

BY CHRIS YALONIS

CHRISTOPHER BING

Distributed data base management systems are still more talk than reality. But out of the debate provoked by this software technology and out of the confusing clamor of definitions and claims made by various vendors, the outlines of something real are beginning to emerge. "There really is no such thing as a true distributed data base management system available on the market today," says Ron Ross, editor of the "Data Base Newsletter" in Boston. "Some vendors are making progress, though, and we are beginning to see forerunners of powerful distributed systems that will come to be an integral part of data processing environments in many sophisticated organizations."

Several companies — such as Applied Data Research, Inc., Oracle Corp., Relational Technology, Inc., Software AG of North America, Inc. and Sybase, Inc. — have announced distributed DBMS products. Other vendors, such as Cincom Systems, Inc., Computer Corporation of America and Cullinet Software, Inc., have announced their strategic directions in distributed products. Meanwhile, a few intrepid user organizations are testing the waters with systems that incorporate some of the functionality of distributed DBMS.

Carnegie-Mellon University in Pittsburgh is developing an ambitious distributed data base that will tie 6,000 to 8,000 Intel Corp. 80386-based personal computers and Sun Microsystems, Inc.-class workstations into a decentralized, campuswide network. The network is based on Relational Technology's Ingres/Star. Students will use it primarily to tap administrative data bases, but each PC and workstation will also have its own local data base capabilities.

Earlham College in Richmond, Ind., is a production site for Oracle's distributed product, SQL Star. Earlham has benefited from its ability to incrementally raise performance without resorting to a mainframe purchase. The college has two networked Digital Equipment Corp. VAX-11/750s. Screen application loads are spread across the CPUs, enhancing the system's power.

In the past, without a distributed data base, users had to log on to the one node on the network on which Oracle resided. SQL Star now allows data bases to reside at the local level. All entities share some general student information, while access to specific data is limited by need.

Houston Lighting and Power Co. has implemented a nuclear power plant spare-parts procurement and inventory system based on a Dataease International, Inc. DBMS. A Prime Computer, Inc. minicomputer holds the master parts list, and the various departments assembling the data base use PCs to download and upload parts information from three mainframes.

The utility company has tied several data bases together and broken the central data base into 16 fragments, any of which is accessible by any node on the network. Charlie Howe, the company's local-area network administrator, says, "We have about 120 employees using about 60 nodes, primarily micros. No one knows that

---

Yalonis is chairman of The Jupiter Group, a Sausalito, Calif., firm that assists companies in the computer industry with research and planning.

Data dispersal

FROM PRECEDING PAGE

they're on a LAN or where the data resides. It comes transparently from any one of 16 servers."

These days, figuring out what really qualifies as distributed DBMS is not easy. The term has been stretched and distorted through its use as a marketing tool.

With a distributed DBMS, different machines on the network are able to exchange data with one another transparently. Data can be stored wherever it is convenient, optimizing the processing load and best utilizing available disk space.

Data access is transparent and can be accomplished readily by any authorized user. The data base administrator disperses data, files or parts of files across the network to local machines that use it most often. Users view data on the network as a single data base, even if the data is located on a number of separate, heterogeneous devices.

Given these capabilities, a sales planner could construct a query to retrieve all the sales of products with prices of less than $100. The request would go across the network to all the product group departments and retrieve the needed product sales information.

Best is yet to be

A real distributed DBMS provides much more than just access to data across a network.

Distributed processing allows users to request data from a server on a remote node and to access one remote data base at a time, assuming the name of the node housing the data is known. This is different from a distributed data base, which allows users to access more than one data base at a time without knowing the data location on the network.

Although some vendors offer parts of distributed DBMS technology, no vendor has yet to put together a full one.

The primary gap, according to Ross, is lack of support for referential integrity. Referential integrity means all entries must be legitimate and clean, checked by the dictionary for reference across all nodes. The data must not be corrupted, and communications links must provide full transparent failure recovery, back-out and provisions for lockout.

"In a heterogeneous environment, this is very difficult to accomplish," Ross says. "So far, it has not been achieved by any vendor."

Seven standards

The Gartner Group, Inc., a Stamford, Conn., market research firm, has established seven standards on which to evaluate distributed data bases, based on types of transparency. Depending on its type, transparency can mean the invisibility of a process to a user or full, simultaneous distribution of functionality to all nodes.

The types of transparency a full distributed DBMS should sponsor are the following:

- **Retrieval transparency,** which means data can be retrieved from any site, regardless of where the transaction originates, and the results received are the same for all sites.

> A REAL distributed DBMS allows users to access more than one data base at a time without knowing the data location on the network.

- **Update transparency,** meaning that data can be updated at any site, no matter where the update originates, with the same effect as an update from any other site.
- **Schema transparency,** which means any user can make data definition schema changes from any site, and those changes will be visible throughout the network.
- **Performance transparency,** meaning that a command made at any site performs as the same command from any other site. For comparable performance, a distributed DBMS must have a distributed query optimizer that views the whole network and constructs an access plan to reach a determined processor best suited to process that query.

The query optimizer must analyze the queries for joining data across multiple machines so that the volume of data on the network is minimized. The bulk of the work is directed to the machine with the most available resources or to whatever node a network administrator explicitly designates; otherwise, the shortest path to the data or a copy of it is used.

- **Transaction transparency,** which means that transactions should be serialized to provide efficient concurrent access, updating multiple sites in a two-phase commit process. In the first phase, all target sites are prepared; in the second, the update command is executed. This procedure ensures data integrity because it minimizes the update process's vulnerability to disruption from site crashes or simultaneous accessing.

Most distributed DBMSs handle update integrity at the local application level only, not at the network server level. Most likely, true data update integrity will come from this latter approach. Unfortunately, the more integrity rules, the more processing and transmission baggage that is created.

- **Copy transparency,** meaning that the loss of one site does not cost the network any data. Even with the loss of several nodes, the system maintains high

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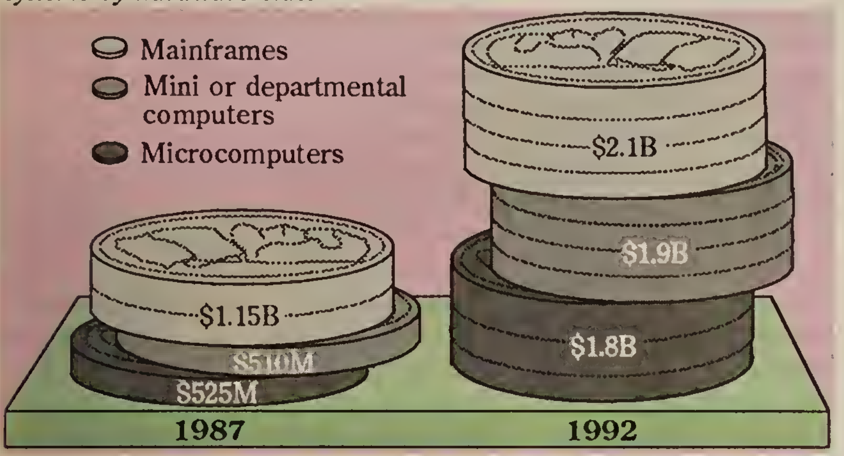
Capital accumulation

Current and projected expenditures for data base management systems by hardware class



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availability of data with redundant copies. This redundancy presumably improves performance by putting needed data closer to users and by lowering communications costs.

Just as important is the assurance that data can be accessed even when the machine with the original copy is unavailable. In homogeneous environments, replication is accomplished by hardware and the operating system. But in heterogeneous systems, the distributed data base must do the work itself. Application copies throughout the organization must be consistent. New versions must be properly distributed, or users in different departments may end up using different inventory algorithms.

- **Tool transparency,** which means that all tools provided by the distributed DBMS vendor are applicable to all sites.

Here and now

Most vendors introduce their distributed products in phases. The initial phases are products that allow distributed queries. Later, the market will see systems that support synchronization of replicated data and updates across multiple nodes within a single transaction.

Both Relational Technology and Oracle are offering distributed versions of their mainstay data base products, Ingres/Star and SQL Star, respectively. Both systems can transparently retrieve data, perform joins across multiple sites and update any site in the network.

However, current versions restrict updates to only one site at a time. The more difficult feat of performing distributed updates within a single transaction will probably be seen commercially in the near future.

With Ingres/Star, Relational Technology is taking a three-phase approach to full distributed functionality. Phase 1 includes location transparency, multisite read transactions with single-site update, SQL and Quel — Relational Technology's query language — support for VAX and Unix and application tools support.

Phase 2, being implemented now, offers multisite updates, data replication, support for IBM and compatible microcomputers and access to companion SQL-based systems. Within a year, Phase 3 should include gateways to non-SQL-based DBMSs, including IBM's IMS.

SQL Star runs on IBM's VM/CMS systems and DEC's VAX/VMS, with PCs acting as client workstations. It also provides gateways to IBM's DB2 and SQL/DS.

Software AG's Adabas runs on DEC's VAX and on IBM mainframes under a wide variety of operating systems. It incorporates an open architecture to include third-party applications in a variety of hardware environments. In its newest release, Adabas includes a distributed DBMS, integrated text and document-based processing, extended support for SQL and relational data models.

> DISTRIBUTED updates within a single transaction will probably be seen commercially in the near future.

Vendors are currently working on products that allow fragmented data base tables and the distribution of those fragments across different nodes.

The upside potential

Although distributed DBMS is still in what could be termed a pilot stage, the approach clearly offers many potential benefits, especially for large, decentralized organizations and consumer-oriented companies with online transaction systems.

One advantage is the fact that data is more available and reliable at the local level. This availability does not compromise the ability to share and consolidate at the global level. Another is that communications costs are reduced by the ability to flexibly decide whether data should be moved to a query or vice versa.

User interfaces are simplified with distributed DBMS, because

Continued on next page

Hierarchical model keeps loyal following

BY BARBARA SEHR

In an era of instant answers, instant recall and instant gratification, hierarchical data bases may seem to some like a throwback to a period of vacuum tubes and slide rules.

Despite the increased penetration of today's generation of relational data bases, however, hierarchical data bases remain the workhorse for intensive transaction processing users. Banks, insurance companies and other high-volume users continue to swear by the old reliable hierarchical data bases such as IBM's IMS, which was developed in 1969.

Programmers find it easier to write applications within the relational environment. However, when compared with a 20-year-old process, relational products represent an untried and unproven technology in which limitations are still being discovered.

Wary of immaturity

Focus Research, Inc., a West Hartford, Conn., research firm, says 17.9% of all mainframe users surveyed in January still use IMS. An additional 15.9% use IDMS/R, a third-party hierarchical system from Cullinet Software, Inc.

Although the survey found that 57% of all IMS users were also running IBM's newer relational product, DB2, these instances were described as "limited use." Many organizations, while willing to convert for certain isolated applications, remain steadfast in their belief that relational products are unsuitable for the bulk of their processing.

Relational products are immature, says Charles Plesums, acting director of systems research at United Service Automobile Association (USAA) in San Antonio.

DB2 is used at USAA, he says, but only for minor programming functions. The heavy commitment is to IMS, and that commitment was recently reinforced through a five-year, $120 million development program for one of the insurance giant's subsidiaries.

"Relational products are great for small shops with just a few hundred terminals," Plesums says, "but large shops like ours have to stick with IMS."

John White, vice-president of information systems and services at Texas Instruments, Inc. in Dallas, also says he has doubts about DB2 serving as a primary data base management system in the short term.

"Development time is about a fifth of what it is under IMS," he says. But, he adds, it could be 10 years or more before DB2 is ready to shoulder the burden of an intensive environment.

Like Plesums, White continues to depend on IMS to handle the majority of his processing requirements. TI runs its complete operations, including inventory, accounting and manufacturing procedures, under IMS. It has done so for more than a decade and just completed a 10-year corporate commitment to convert its operations to IMS, according to White.

> MANY organizations remain steadfast in their belief that relational products are unsuitable for the bulk of their processing.

There are two reasons IMS is still around, White says. The first is that the system has built up a huge library of applications in its nearly 20 years of availability. This library gives the relational data base a life of its own.

For TI, a complete conversion to DB2 would probably mean an additional 10-year commitment, he says. "It may not take as long to write [for DB2] as it did for IMS, but the flywheel is bigger — there are a lot more applications now," he says.

The second reason is related to IMS's ability to bear up under demanding applications. "The performance of hierarchical data bases is simply so much better," White adds.

And VAX, too

Strong commitment to hierarchical data bases among large users is not limited to the IBM mainframe market.

The fast-growing VAX market is an attractive target for makers of third-party relational data bases, such as Relational Technology, Inc.'s Ingres and Oracle Corp.'s Oracle. However, like IMS, hierarchical products within the Digital Equipment Corp. VAX market date back to the origin of the VAX itself, and relational vendors are finding user loyalty tough to penetrate.

Gary Zander, group leader for information systems at International Flavors and Fragrances, Inc. in Union Beach, N.J., says his firm has used DRS, a hierarchical product from Advanced Data Management, Inc., from the time it acquired its first VAX more than 10 years ago. "DRS is significantly faster than relational products," Zander says.

As relational products acquire more muscle and maturity, a shift will eventually occur even in bastions of hierarchical DBMS, says James Russo, vice-president of marketing at Focus Research. But, he says, it will probably happen very slowly and over a long period of time. •

Sehr is a free-lance writer based in Seattle.

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users are insulated from the processes required to locate and access data and develop queries on a variety of hardware, DBMSs and networks.

The potential also exists for a better fit between the DBMS and the organization than undistributed systems can offer. Most organizations are logically as well as physically distributed, and a true distributed DBMS can accommodate that.

Finally, distributed data bases offer reduced hardware expenditures. A firm can obtain better price/performance from departmental systems than mainframes can.

With a distributed DBMS, a company can hook together a number of small and medium-size computers and get much the same power offered by expensive mainframes. An Intel 80286-based data base server may accommodate up to 16 users, possibly 64 using a 386-based server.

For 100 or 1,000 users, the classic mainframe solution is to get a bigger server. Many organizations would rather get a second 80386-based machine, put it on the network and access those two machines as if they were linked together. To do that, you need a distributed DBMS.

Winning acceptance

Right now, sales of distributed DBMS products represent only a tiny fragment of the total DBMS market, which Dataquest, Inc. in Santa Clara, Calif., projects will reach $1.5 billion this year. However, Input, located in Mountain View, Calif., says distributed DBMSs will make up 15% of the data base market by 1992.

Moving up to that position will require some maturation, according to Forrester Research, Inc., a Cambridge, Mass., market research firm. In a recent study, Forrester concluded that the current generation of distributed DBMSs is immature relative to a full distributed DBMS's potential and is likely to appeal only to early adopter types.

The growth rate of distributed DBMSs also depends, in some part, on how quickly other issues competing for MIS attention are resolved.

MIS directors are currently dealing with more pressing issues, according to Ed Acly, analyst at International Data Corp. in Framingham, Mass. "DB2 is still taking up a lot of MIS directors' attention," he says. "Distributed DBMS is still not at the top of their lists. We'll see real penetration of distributed systems in the early 1990s."

Planning for distributed DBMSs also requires prior planning for network strategy. Before they take that step, many large DP shops are waiting for IBM to clarify its long-term plans.

Several recent developments in standards have helped to stir interest in the distributed DBMS market. Communications standards, such as Open Systems Interconnect and Manufacturing Automation Protocol and Technical and Office Protocol, allow heterogeneous computers to exchange data.

ANSI-standard SQL supports access to different data bases and is being incorporated into most distributed data base products. Finally, IBM's LU6.2 protocol provides a standard interface for transaction processing and allows application programs to communicate via IBM's Advanced Program-to-Program Communications facility.

> "DB2 IS STILL taking up a lot of MIS directors' attention. Distributed DBMS is still not at the top of their lists."
>
> ED ACLY
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Technical clouds

A number of technical issues, however, are impeding users from translating into action their interest in distributed DBMS.

A crucial element missing in all current offerings is a comprehensive set of software gateways allowing access to older installed mainframe DBMSs such as IDMS/R and IMS so that they can be incorporated into newer relational data bases. Today's distributed DBMSs are based on relational technology and, as such, link distributed data bases to other relational systems. Constructing a gateway from a distributed data base to a nonrelational data base system is a much bigger challenge.

Another thorny technical problem is the two-phase commit process that ensures data integrity. Today, neither of the two leading distributed DBMSs from Oracle and Relational Technology offer multiple-site update capabilities, although both companies have announced their intentions to provide this function.

Even SQL, which by promising a common user interface has done much to pave the way for distributed DBMS, raises some questions because of its current not-quite-standardized status. Right now, no two SQL implementations are identical, even within IBM, which uses different versions with DB2 and SQL/DS.

In the end, SQL will probably not provide the interface solution that potential users of distributed DBMSs are really looking for. With the proliferation of different microcomputer data base and spreadsheet programs entrenched in users' everyday work styles, acceptance will not occur until someone finds a way for people to use their own favorite

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programs to interact with the distributed network. Either that, or most nodes will need to have easy-to-use, custom menus built with limited query latitude.

There are signs that the first avenue may soon be a real option. The market for DBMSs that closely integrate PCs is rapidly evolving and has recently seen several large-scale strategic partnerships form.

In January, Microsoft Corp., Ashton-Tate Corp. and Sybase, a relative newcomer, announced a partnership to develop a relational data base using the Sybase data base engine. Late last month, Lotus Development Corp. and Gupta Technologies, Inc. announced a joint project to develop a relational data base tied to a Lotus DBMS product.

Many of these alliances are aimed at creating bridges between popular microcomputer applications and the powerful relational data bases that run on minicomputers or supermicros. Within a year, IBM is set to introduce OS/2 Extended Edition and its SQL-based Data Base Manager, which will be able to tap DB2.

Relational Technology is working with Sun Microsystems to create a standard data base for workstations. And last summer, Apple Computer, Inc. took a 5% interest in Sybase, which is creating a data base product for the Macintosh.

These alliances will hopefully turn out products to allow customers of future distributed data bases to use their favorite microcomputer applications to interact with the network.

> NOT ALL the difficulties of implementing distributed DBMS have to do with the products. Some elements within organizations hamper a distributed approach.

All in the readiness

Not all the technical difficulties associated with implementing distributed DBMS have to do with the products themselves. Some elements within organizations hamper a distributed approach.

One example is "antirelational" data embedded in numerical data bases. Numbers for many organizations are not just numbers but can also designate unique categories or information; consequently, the data has different meanings in different geographical locations or divisions within the same company.

Furthermore, certain types of organizations are structurally unsuited for distributed DBMS. While insurance companies are highly decentralized and thus generally receptive to such a system, some businesses have centralized control, which would not mix with this approach.

Beyond these considerations, there are several questions that anyone contemplating the possibilities of distributed DBMS should consider to determine what sort of product is really needed:

- Should we distribute data, or do we need to distribute only access to data, with the data itself remaining at the site?
- Do we want ultimate authority over data definition and access handled locally, globally or both?
- Will we obtain better performance with compiled or interpreted code, given the characteristics of our applications and the stability of our data bases?
- When a line fails, how do we balance the need for availability with the need for data integrity? How do we balance the cost of recovery with the need for integrity?
- In updating replicated data, how do we weigh the cost of simultaneous updates vs. the need for data integrity?

For your consideration

Unfortunately, organizations that decide they might be candidates for distributed DBMS have a confusing and little traveled path ahead of them. Distributed DBMS products for heterogeneous environments have been implemented for only a year.

The places that have installed such systems are still cutting their teeth on them. Benchmarks are complicated, and even a vendor's test statistics can be manipulated to show its product to the best advantage.

Still, it is possible to enumerate the major must-have features for distributed DBMS. They include the following:

- **Data independence.** The DBMS should divorce the logical from the physical aspects; that is, the data base function should not depend on the physical location of the data. While many new distributed DBMS products incorporate this capability, users of older systems could tell plenty of war stories about having to change entire applications because data needed to be stored on different drives in different locations and the DBMS couldn't support it.
- **No reliance on a central site.** All functions of the system, including the data dictionary, should be distributed. This decreases the danger of performance logjams and reduces the possibility of the whole system going down if the central site fails.
- **Backup and recovery procedures.** These should protect the integrity of the data in the event of a central server or node failure. Synchronizing updates on fragmented data means all nodes must be available in order to complete the transaction. Thus, these transactions hold little threat to data security.

Replicated data that must be updated synchronously requires a strategy for handling processor and line failures.

Line failure poses a real threat to integrity because two processors could, while a line is out, update the same data, perhaps creating values that could never be reconciled without human intervention. Those values could then spread throughout the system like a virus.

One recovery scheme to preserve integrity during a line failure specifies where processing can proceed and stops processing on the replicated data at all other nodes. This strategy completely synchronizes the data bases as soon as communications are restored.

Another recovery scheme restores a data base on an as-needed basis. This method, called lazy or casual recovery, relies on a time stamp mechanism. Once a line fails, the secondary processors that are allowed to update the replicated data initiate a time stamping process.

After the line is restored, the secondary processors compare the time stamps on any replicated data that is accessed. The secondary processors synchronize the data if necessary before initiating the current transaction.

- **Continuous operation.** Adding a new site to the system or upgrading software at one site should not bring the whole system down.
- **Fragment independence.** Data should be able to be fragmented and stored closest to the site at which it is used most.
- **Compatibility with other DBMSs, operating systems, networks and hardware.** Distributed systems need to be able to transfer data back and forth, for example, along and between DEC's Decnet, IBM's Systems Network Architecture, LANs and wide-area networks. Data should be able to be exchanged between a DB2 data base at one site and an Oracle at another.

Because most organizations have diverse needs and require different data bases, the ability to accommodate existing data and programs with known interfaces is critical.

- **Performance.** The system should have a query optimizer that chooses the best route and CPU for processing. Depending on the query processing, a query can be answered in as little as three seconds or as long as 2½ days. Requests can tie up a network and slow down performance, so data cannot be located at the farthest point away from the users who need it.
- **Transparency.** Users should not have any awareness of what drive, what processor or what DBMS is being accessed.
- **Updates.** The storing of data in one server and other data in another remote server complicates the update process tremendously. Users have to make sure that the data in both servers is affected simultaneously.

Class leaders

Market share percentage of top performers in small- and large-scale data base management system software, measured by units or dollars

Small-scale DBMSs	
Ashton-Tate	35%
Microrim	11%
Micro Data Base Systems	10%
Condor Computer	5%
Stoneware	3%

Large-scale DBMSs	
IBM	50%
Cullinet	15%
Applied Data Research	8%
Software AG of Nor th America	5%
Martin Marietta's Data Systems Division	4%

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CW CHART

This gets even more complicated when the data base has to accommodate possible shutdowns of a node or server or the breaking of a transmission line. Recovery needs to ensure the data integrity of all the relevant data bases throughout the network.

- **Replication independence.** To minimize traffic, pieces of data should be able to be copied and stored at many sites, if necessary. Users should not have to know whether the data is replicated or, if it is, which replicate is being used.
- **Data communications software/interface.** Especially for geographically dispersed organizations, the distributed DBMS adaptability to the data communications configuration is critical.
- **Data base definitions.** The system should directly and automatically support one-to-many and many-to-many relationships between entities.
- **Security.** Access control should be provided to the data item level and, in some cases, down to the value level.
- **File format compatibility.** The system should offer utilities or the capability to harmonize different file formats and data base organizations.
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How PC users cast votes

BY KATIE GURLEY

• Keith Bailey is a stickler for detail. As director of sales and marketing at Orlando Lutheran Towers, a retirement community in Orlando, Fla., his job is to woo and win as many prospective clients as possible. Part of his strategy is to keep track of the personal data — name, age, health, marital status and so on — of hundreds of prospects every day. For Bailey, such information is the lifeblood of making sales.

• Terry Turner gets yelled at a lot. He also gets complimented. People ask him a lot of questions. Turner takes none of this personally, of course, because it's his job to field hundreds of these verbal fly balls and guide them to their appropriate places in the corporate infield. Turner is in charge of the customer affairs center — generically known as the complaint department — at Seafirst Bank.

These two men work thousands of miles apart and hold very different jobs. What they have in common with each other and with many everyday users of microcomputer data base software are the features they prefer in such packages.

Bailey, Turner and other users like them say their primary considerations in such software are ease of use and the speed and efficiency with which it can assimilate, categorize and organize raw data. Users also appreciate programming capability and mobility, as exemplified in such features as the ability to inload files from other application packages or to access one file while working on another.

As assistant vice-president and manager of the Customer Affairs Center at Seafirst Bank in Seattle, a wholly owned subsidiary of Bankamerica Corp., Turner handles about 1,000 questions, complaints and compliments from customers every year. He estimates that 99% of his work is done on his Apple Computer, Inc. Macintosh 512K using the Omnis 3 Plus relational data base from Blyth Software, Inc.

"The most important thing to me is that this is a very user-friendly system that doesn't require a person to be an expert," he says. "That allows me, as a manager, to be much more productive and efficient."

Turner uses the data base daily to track inquiries by date, source, subject and which bank department the inquiry concerns. About 800 typical inquiries or complaints have been coded. When an inquiry or complaint comes in, the codes are entered into several major files broken down by department.

Using Omnis 3 Plus, Turner keeps track of the status of each problem or inquiry until it is resolved. Other reports generated from the data base keep Turner apprised of patterns in complaints and complaint handling.

Jean Anderson doesn't manage complaints, but she does manage something just as touchy — other people's money. An administrator of pension and retirement plans at the Independent Service Co., a pension and retirement fund administrator in Albert Lea, Minn., Anderson's job is to see that customer funds are correctly divided and dispersed to different accounts for investment.

> "THE MOST important thing to me is that [Omnis 3 Plus] is a very user-friendly system that doesn't require a person to be an expert."
>
> TERRY TURNER
> SEAFIRST BANK

She does this with the help of Powerbase, a Microsoft Corp. MS-DOS data base from Powerbase Systems, Inc., a Compuware Corp. subsidiary based in Farmington Hills, Mich.

"Powerbase calculates the amount for each person and funnels the different funds into different accounts," Anderson explains. "Then it does a hard-copy report for the customers."

Anderson, who has no experience with other data bases, says she finds Powerbase easy to use and is just starting to use it for other kinds of investments managed by the company.

She says her favorite Powerbase feature is Powerlinks, which enables her to load client information from, for example, Lotus Development Corp. 1-2-3 spreadsheets into her data base. Some clients also provide their investment information on a diskette, which Anderson can enter into the data base in seconds, saving her hours of time each month.

Vern Challgren, a research data analyst at Dekalb-Pfizer Genetics in Dekalb, Ill., uses Dbase III Plus from Ashton-Tate Corp. to store data on test crops. Dekalb-Pfizer manufactures agricultural seed. Challgren's data includes what seed is being tested and where, the population of the state and county in which the test crops are and crop yield and quality.

"Using Dbase, we can sort the information, pull out the selected information

Continued on page S16

Gurley is a free-lance writer based in Wellesley, Mass.

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Micro relational DBMS: Weighing trade-offs

BY FABIAN PASCAL

The microcomputer data base management system market is undergoing a revolution similar to one that has already occurred at the mainframe level: Traditional products must either adjust to the relational, SQL-based approach or give way to products that are based on it.

Adopting a relational strategy in the micro environment is not easy. The single-user, single-tasking DOS operating system with 640K-byte memory has constrained functionality, performance or both for SQL implementations. Vendors can mimic mainframe and mini versions but only at the expense of simplicity and ease of use.

Furthermore, the current ANSI SQL standard is weak. It lacks some basic capabilities and offers only limited support of others. The American National Standards Institute (ANSI) is only now considering some critical relational features. This means vendors can either adhere to the ANSI standard and limit their competitive edge or add useful functionality and impose on their customers the risks associated with lack of standardization.

> VENDORS can either adhere to the ANSI standard and limit their competitive edge or add useful functionality and impose on their customers the risks associated with lack of standardization.

In general, the tendency has been to not deviate much from the de facto "standard," which is a combination of the ANSI standard and IBM's slightly more functional DB2 dialect. Vendors have extended it into useful areas but have avoided fundamental relational features such as keys, domains, integrity and updatable views. Consequently, all commercial personal computer implementations are both subsets and supersets of the SQL standard.

There are, however, some important differences in how various vendors approach their micro strategies, especially in terms of connectivity. Because only genuine and relatively complete SQL systems will confer on users the full benefits of relational fidelity and standardization, it is most important to look at products that fit this description.

Users should familiarize themselves with relational technology and SQL and beware of incomplete or highly proprietary implementations or of SQL interfaces placed on top of nonrelational systems.

Oracle Corp., in line with its aggressive multiplatform strategy, has ported its full mini/mainframe version of Oracle to the PC. The product is clearly targeted at developers and PC environments, as its considerable customization, administration and tuning options attest.

PC Oracle's SQLplus dialect is broadly compatible with the de facto standard but is profusely extended. The product also offers some unique features such as row-level and recursive functions and extensions for physical space management.

The advantages of PC Oracle are portability of applications across supported platforms (of which there are many), more functionality and control and, for the vendor, simplification of development and support. On the other hand, the PC's architecture is not fully exploited externally. Internally, complexity baggage and extended memory requirements also limit the number of compatible machines.

Oracle is strongly committed to the micro market, and it appears that the firm's connectivity strategy includes a local-area network server under OS/2 — IBM and Microsoft Corp.'s operating system for the Personal System/2 — and its distributed DBMS, SQL Star.

From Unix to DOS

Informix Software, Inc. has also ported its full minicomputer product to the PC, bringing it from Unix to DOS. The Informix SQL dialect, RDSQL, stays close to the current standard. Externally, the product is in tune with the PC environment, sporting a clean, integrated, Lotus-like menu interface.

In addition, the company's latest version of its SQL-based Informix 4GL offers a windowing capability and color. While it is not very resource demanding, the product is also not fully optimized for the PC.

Informix's commitment to the DOS platform has not been very clear, but the company has announced OS/2 support and offers a new SQL engine, Turbo, for the Unix environment. Connectivity is supported with a file server approach under DOS/Netbios and with data base servers under Unix/Starlan.

Relational Technology, Inc. has taken a different approach with Ingres, also a product of mini/mainframe origin.

To minimize compromises on portability, performance and standard PC configuration, certain SQL functions considered to offer primary utility in a shared data environment can be included in PC applications. These take effect, however, only when ported to Ingres multiuser platforms.

Such features — for example, integrity, transactions and concurrency control — are called "no-ops." The core of Ingres SQL dialect is standard-compatible with the usual extensions, but no-ops are in Relational Technology's own relational language flavor, Quel, which is generally considered superior to SQL.

Written to size

Since the Ingres front end was quite compatible with PC user expectations, Relational Technology preserved it. But the package was rewritten for, not ported to, DOS, with very good performance results.

Although an SQL engine has long been announced, Relational Technology has not been aggressive in the PC market. The company focuses connectivity on its advanced distributed DBMS, Ingres/Star, but gateways to other DBMSs — most recently Ashton-Tate Corp.'s Dbase IV — have also been announced.

Gupta Technologies, Inc. has created in SQLbase a product written entirely for the PC but with explicit connectivity intentions. For access to other SQL servers, Gupta kept its SQLtalk dialect close to the de facto standard and chose a server/requester architecture. Its PC orientation yields very good performance.

Gupta's approach commits the company to the micro market, and support for OS/2 and Windows has long been announced. SQLbase is the first — and currently the only — LAN server to run under DOS/Netbios. One IBM Advanced Program-to-Program Communications gateway to DB2, called SQLnet, is available, and similar plans exist for other mini and mainframe SQL servers.

Software Systems Technology, Inc.'s XDB is the PC relational DBMS par excellence. Its SQL dialect is compatible with the standard and provides the usual extensions. It is the only DBMS whose design was done entirely with PC users, including end users, in mind. It offers an integrated, well-designed set of menu-prompt-driven tools that are capable and extremely easy to use.

Various tests have consistently found the performance produced by XDB's explicit PC orientation to be significantly superior to the competition's. The company has announced its intention to include referential integrity and a LAN server under DOS/Netbios.

Tipping the balance

In addition to these, a few new players have announced micro DBMS entries that are noteworthy. The SQL data manager embedded in IBM's OS/2 Extended Edition, Sybase, Inc.'s Dataserver and Lotus's Lotus/DBMS — an SQL LAN product — are certain to change the market equation.

IBM's SQL data manager is rumored to initially provide limited tools but good compatibility with DB2. The Sybase Dataserver will have advanced relational features, and front-end support has been announced by Microsoft, Ashton-Tate and Sybase itself. Lotus/DBMS, with backing from Gupta, will also have an SQL LAN server/requester architecture.

These products and others that will be released in reaction to them are sure to change the market equation. Competition is going to be intense, characterized by claims of superiority.

But as this brief overview shows, PC users should approach the DBMS selection process with a good understanding of the trade-offs and how they relate to the needs of their specific environments. •

Pascal is a Washington, D.C.-based independent analyst and consultant specializing in relational data base management and SQL on micros. He is affiliated with the Codd and Date Consulting Group.

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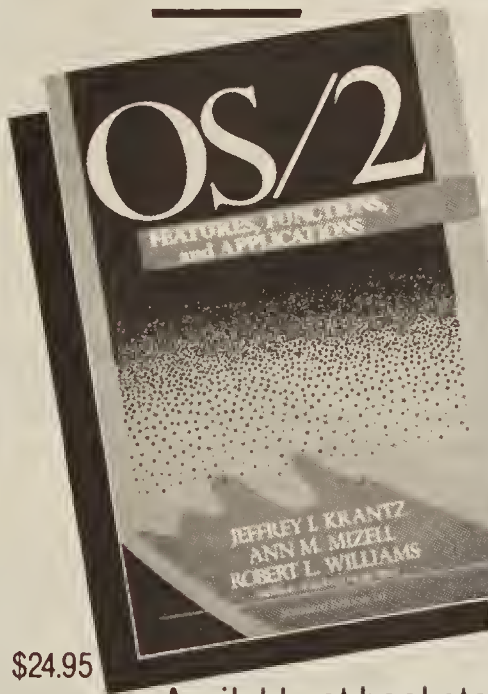

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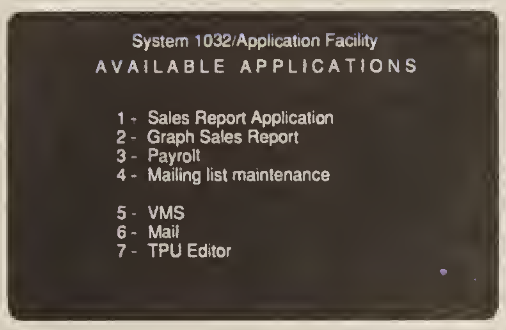
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ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

Why did Advanced Data Management choose to emphasize Digital Equipment Corp.'s VAX environment for DRS? Is the company developing anything new for the product in the IBM environment?

Lou Walker
Computer specialist
Navy Surface Warfare Center
Dahlgren, Va.

ADVANCED DATA MANAGEMENT, INC.: The VAX promised economical computing and well-developed time-sharing in a computer compatible with our then-current PDP product. The richness of the interprocess communications features, the integrated debugging facilities and the VAX standard-call interface make the VAX a very productive machine to develop on.

Current plans for DRS include providing a high-performing data base system in a mixed-vendor environment. ADM is currently in the process of porting DRS to the Unix environment. After a feasibility study is completed, a decision will be made as to whether ADM should reenter the IBM mainframe marketplace.

The IBM Personal Computer environment is a different arena. ADM is providing full DEC Vaxcluster support in its next release. Cluster support is provided as the precursor to generalized network support. At that time, an IBM PC-based workstation could be used to handle local validation and screen formatting chores.

Does Henco Software plan to interface Info-DB+ with RDB, DEC's relational data base? And will there be a gateway for Wordperfect Corp.'s Wordperfect word processing?

Also, when using Info-DB+, how do you define or simulate a matrix variable?

John Forbes
Project manager
Information Planning Associates, Inc.
Falls Church, Va.

HENCO SOFTWARE, INC.: We are currently planning the next major release of Info-DB+ on the DEC VAX. One of the goals of the next release is to implement the most important enhancements to the basic functionality of Info-DB+. We have identified approximately 75 enhancements for the next release of the product, including support for both arrays (matrix variables) and the Wordperfect document format.

Data Access's Dataflex does not currently support SQL. Are there any plans in the future to support SQL standards?

Also, Data Access is working with another company to develop a data base server on a proprietary network.

Are there any plans to support data base servers on IBM Netbios-compatible local-area networks, such as Novell, Inc.'s Netware?

Steve Fisher
Director of software development
Automated Design Systems Corp.
Colorado Springs

DATA ACCESS CORP: Data Access plans to provide SQL connectivity in Dataflex this year. The project referred to is the Dataflex product for Lifenet from Univation. Univation implemented the data base server software, and we integrated it into Dataflex. The resulting product handles both traditional Dataflex files and files managed by the server.

We are currently investigating other data base server software, such as Novell's Btrieve on Netware, for potential integration with Dataflex. We are also considering authoring our own data base server software as an integral part of future Dataflex revisions.

Since traditional data management products offer fourth-generation language features, how will an established fourth-generation product such as Information Resources' Express differentiate itself as a decision support system?

Steve Thompson
Senior systems consultant
First National Bank of Chicago
Chicago

INFORMATION RESOURCES, INC.: We still differentiate the Express product line by continuing to focus on analysis and planning needs, for which traditional data base management systems (relational, hierarchical and so on) are weaker.

In particular, traditional DBMSs are more transaction- than analysis-oriented. They specialize in selecting, updating and displaying detailed, record-oriented data. In contrast, decision support applications require more flexible manipulations on time series and cross-sectional data, typically at more aggregate levels.

The Express family is well suited to these analysis-based

Continued on page S16

Images in memory and on the screen

BY REBEKAH WOLMAN

The Electric Power Research Institute (EPRI) in Palo Alto, Calif., wants to simplify research and speech making for staff members at its more than 600 member utilities. To that end, the institute's Technology Transfer, Energy Management and Utilization Division devoted a year to building a remotely accessible electronic resource library that includes 2,000 slide images and video images of scripts, marketing brochures and technical advisories that support the slide presentations. Division manager Greg Lamb says this resource will offer members access to a supply of ready-made words, images and related research.

A major building block in the creation of this resource facility was Picturepower-HC, one of a line of picture data base systems from Pictureware, Inc. in Bala Cynwyd, Pa., that runs on the IBM Personal Computer and compatibles utilizing a variety of capture/display boards. Picturepower software allows users to capture photographic images in digitized form, edit them and place them in data bases along with text for viewing, retrieval or integration into applications.

> DATA base storage of images is a branch of technology just beginning to flower.

The system includes an internal data base but is also compatible with Ashton-Tate Corp.'s Dbase III Plus.

Because EPRI chose to create its image data base in Dbase III Plus, using Nantucket Corp.'s Clipper as the compiler rather than Picturepower's internal data base, users who want to take advantage of the image library are required to set up two monitors: one for text and one for graphics.

"That is the penalty we had to pay for the design flexibility we wanted," Lamb says. Although the situation is not optimal, he says, it is sufficient for getting the project off the ground.

Picturepower-HC is a high-compression version that reduces image storage requirements by as much as fifteenfold. What that means for EPRI is that 2,000 images can be distributed on a 60M-byte magnetic tape cartridge, while the accompanying text goes out on floppies. In the future, when the institute's entire collection has been cataloged, Lamb says, compact disk/read-only memory technology will replace magnetic tape as the storage medium.

Eventually, Lamb says he envisions users supplementing the EPRI data base with their own slides, giving them a tool to organize their own materials and generate their own slides directly from the stored images.

EPRI's Lamb

Obsolescence isn't the issue for another Picturepower user; but keeping records that reflect inventory in its proper form is. In the art world, there is no substitute for image. That's why a large museum in Washington, D.C., has purchased Picturepower-HC to build a picture data base of its 13,000-item collection.

The museum maintains its data base on an IBM Personal Computer AT with a 40M-byte hard disk. It also uses a 100M-byte optical storage disk but has found it will need 150M bytes more in the future. While the mainframe text data base includes such information as dimensions, dates and inscriptions for each work of art, the limited capacity of the museum's PCs dictates that the Picturepower data base include just three fields — accession number, title and artist's name.

So far, this material has been downloaded from the mainframe into a Dbase III format, and a staff person has begun photographing the works with a Sony Corp. video camera (which is plugged into an AT&T Targa board for digitizing) and appending them to the three data fields. At the rate of 20 images a day, it will take at least 2½ years to complete the project.

The images will be stored on optical disks; the text, on a hard disk. Distribution will probably be accomplished through a few different optical disk stations.

The fact that artwork is stored in various parts of the museum or, in some cases, is out on loan to other museums is what will make the complete catalog so useful. "To see all the works by a particular artist would take a lot of legwork," the registrar says. "Now, using Dbase III's multiple fields, a curator planning an exhibition will query all works of, say, German sculptors from 1910 to 1940 and see the pictures instantly."

In 1983, when Pictureware started working on its system, the closest anyone ever came to images when thinking of data bases were computer-generated graphics.

By 1986, when the first version of Picturepower was released, several hardware developments had converged. Digitizer boards had become available for PCs, and PC processing capabilities had become much more powerful, as had compression and storage technologies. Pictureware currently offers support for optical disk storage of Picturepower data bases.

Pictureware President Michael Marcus says the company had two major applications in mind during the development phases: personnel identification, security and access control; and cataloging merchandise, especially one-of-a-kind high-ticket items like jewelry and Oriental rugs. But now, the software is in use for not only these applications but for more than two dozen others, including slide cataloging projects of the types described.

Pictureware is not the only company that has spotted the opportunity in image making. At least half a dozen others offer products that permit images to be incorporated into data bases.

Information Builders, Inc.'s Focus Vision, which works in conjunction with PC Focus, allows the user to add images to a data base by treating them as a data type. It also allows users to pull images from other applications.

Chorus Data Systems' Color Photobase System works with Dbase III, using Chorus Data's PC-Eye board to pick up images.

Core Analytic's Visionbase offers ready-to-use vertical application shells into which users place data and images. A number of data base systems for the Apple Computer, Inc. Macintosh are also designed to accommodate images.

Data base storage of images is a branch of technology just beginning to flower, according to computer graphics consultant Carl Machover. "Right now," he says, "I would be surprised if it were more than a $10 million or $20 million market, but its potential is enormous." •

Wolman is a free-lance writer based in Cambridge, Mass.

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What's Happening with DB2?

DB2, IBM's strategic RDBMS, has had a powerful impact on the software industry and the information systems community, validating the viability of the relational approach to information management and application development. A major issue facing DB2 users today concerns obtaining tools that add value to the underlying power of an RDBMS such as DB2.

Mainframe Relational DBMS, specifically DB2, for a large portion of the IBM mainframe community represent the ideal platform for implementing Integrated Computer-Aided Systems Engineering (ICASE) systems and powerful application development tools. Other SQL based RDBMS can be deployed in a heterogenous computing environment to support distributed database applications which leverage the expanding power of workstation environments. DB2 also provides an effective platform for leveraging both application software products and the emerging use of application enabling mechanisms.

And although the Symposium focuses on DB2, the emergence of SQL as an industry standard and the potential impact of SAA suggest that the power of DB2 Tools is *not* limited to a DB2 environment. As a result of a comprehensive SQL interface, a significant number of the tools presented during the Symposium are of value to other RDBMS platforms as well. Furthermore, the best of what competing DBMS vendors have to offer is now being extended to the DB2 environment and represent an opportunity to leverage your existing DBMS as well as DB2 where appropriate.

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Symposium Overview

Each day begins with implementation tutorials by Symposium chairman Paul Hessinger and industry authorities. These special lectures and interactive panel sessions will cover DB2 issues of vital importance, including:

- The Relational Family and DB2 Directions
- Re-engineering of Existing Databases and Applications
- Information Asset Management
- CASE for DB2
- The Importance of Value-added DB2 Tools
- Beyond DB2.

Mr. Hessinger opens Day One with an intensive assessment of the DB2 Tools marketplace, including a functional overview of the major categories of tools which should be incorporated into a value-added DB2 strategy. Categories include: Integrated CASE (ICASE) environments, stand alone CASE tools for planning, design, development and maintenance automation, complementary RDBMS with a particular emphasis on distributed database tools, and integrated RDBMS/Tool architecture for the workstation environment, application software, various utilities, and the rapidly growing area of Expert System development tools.

The afternoon sessions as well as the morning of Day Three, feature in-depth product presentations set in a classroom environment and led by representatives from each participating company. These sessions examine the products' features, functionality, and primary applications and will be scheduled to provide you with maximum exposure to each category of DB2 Tools.

At the end of Days One and Two, noted industry experts will discuss key implementation issues associated with the DB2 Tools presented during that day's vendor presentations. These presentations will be followed by debriefing sessions, moderated by Paul Hessinger, where attendees will have the opportunity to engage the experts as well as vendor representatives in a discussion of strategic issues relating to specific products. Also on Day Two, Norris van den Berg, a senior manager from the IBM laboratory in Santa Teresa, the home of DB2, will provide a statement of direction for IBM's "Relational Family."

The Symposium concludes with in-depth user case studies and the definition of alternative 3 to 5 year DB2 implementation scenarios.

DAY	MORNING SESSIONS	AFTERNOON SESSIONS	WRAP UP SESSIONS
I	SYMPOSIUM INTRODUCTION 9:00 a.m.–12:30 p.m. Paul Hessinger STRATEGIC USE OF TECHNOLOGY RELATIONAL UPDATE DB2 CONCEPTS/STATUS CATEGORIES OF TOOLS	PRODUCT FOCUS: CASE TOOLS	4:30–5:30 p.m. GUEST SPEAKER Vaughan Merlyn CASE for DB2: Market Research
		VENDOR (1:30–2:20)	
	GUEST SPEAKERS Dr. George Schussel or Jeff Tash INDUSTRY ANALYSIS	VENDOR (2:30–3:20)	"Debriefing" of the day's vendor presentations (Merlyn and Hessinger)
		VENDOR (3:30–4:20)	
II	8:30–11:20 a.m. Norris van den Berg, IBM DB2 DIRECTIONS	PRODUCT FOCUS: CASE, DISTRIBUTED RDBMS	4:30–5:30 p.m. GUEST SPEAKER Marilyn Bohl
	DISTRIBUTED DATABASE & SAA IMPLICATIONS PANEL moderated by Paul Hessinger w/IBM, 2 users, and 2 vendors	VENDOR (1:30–2:20)	DEBRIEFING SESSION Marilyn Bohl and Paul Hessinger
		VENDOR (2:30–3:20)	
	VENDOR (11:30–12:20)	VENDOR (3:30–4:20)	
III	8:30–10:20 a.m. GUEST SPEAKERS Dan Appleton Charles Bachman Re-engineering vs. Architecture for leveraging DB2	PRODUCT FOCUS: Utilities and Applications	SYMPOSIUM SUMMARY (3:30–5:00 p.m.) Paul Hessinger
	PRODUCT FOCUS: Utilities and Applications		
	VENDOR (10:30–11:20)	VENDOR (1:30–2:20)	SYMPOSIUM ENDS 5 P.M.
	VENDOR (11:30–12:20)	VENDOR (2:30–3:20)	

Who Should Attend

Past experience indicates that a symposium such as this is most effective when attended by a group of I/S managers from an installation. A senior I/S Manager when accompanied by:

- Managers of DB Administration
- Managers of Application Development Centers
- Managers of Information/ Knowledge Engineering Centers
- System Technology Planners
- Key Project Leaders

can pull together the various elements of an installation's overall systems plan that often get lost in the pressure of the day to day business environment.

By scheduling a brief brainstorming session with Mr. Hessinger or one of the industry experts present at the Symposium, a group of your managers may find it easier to develop a consensus on your organization's strategy for DB2 Tools.

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Faculty

Hessinger

Paul Hessinger, Symposium Chairman, is the Chief Technical Officer and Vice President of Research for Computer Task Group (CTG), Inc. Mr. Hessinger regularly conducts strategic technology planning efforts for large organizations moving into areas such as RDBMS, CASE, and Expert Systems. In February of 1984 in an in-depth article for ComputerWorld, he accurately predicted the strategic impact DB2 has had and was one of the first in the software industry to present SQL as a meaningful standard for all software vendors and users. In September of 1987, he presented a comprehensive analysis of the DB2 marketplace—another widely read and acclaimed ComputerWorld article.

PRODUCT PRESENTATIONS

APPLIED DATA RESEARCH

ADR, an Ameritech Company, is a world leader in system software for the IBM market. IDEAL, currently used to increase programmer productivity in over 1000 sites worldwide, is an interactive application development, maintenance and execution system for mainframe business information systems. Its interactive workstation coordinates and tracks all activity associated with an application from screen prototyping, to report definition, to program compilation, to version and status management and much more. IDEAL is the right tool for meeting any DB2 programming challenge.

ARTHUR ANDERSEN & CO.

Arthur Andersen's product offering for DB2 is an integrated environment for software engineering. Foundation automates the entire systems development life cycle, and includes METHOD/1, a highly-automated information system's methodology, DESIGN/1, a set of PC and LAN-based tools for planning and design, and INSTALL/1, an IBM mainframe-based environment for implementation and support of DB2 applications.

BGS SYSTEMS, INC.

BGS is a leading vendor of performance and capacity management software. DB2 promises productivity improvements but performance concerns are widespread. The CRYSTAL Performance Evaluator for DB2 calculates application performance, resource requirements, and processing costs BEFORE designs are committed to code. This enables developers to evaluate alternatives and proactively plan for implementation.

BROWNSTONE SOLUTIONS, INC.

BrownStone Solutions, Inc., New York City, offers the DataDictionary/Solution, an open-architected, extensible, ER-based dictionary featuring a DB2 repository and relational power within an interactive dialog. The DB2 Admin/Solution manages definitions and control of DB2 objects and security authorizations, allows impact analysis, enforces naming standards, and leverages DB2 administrative functions.

BUSINESS SOFTWARE TECHNOLOGY, INC.

Business Software Technology, Inc. (BST) is a leader in automated change management and control in the IBM mainframe environment. The ENDEVOR (Environment for Development & Operations) system provides integrated change and library management for all source and executable code and procedures. BST's ENDEVOR-C1 product has a specific release for the DB2 environment that gives the user the ability to interface DB2 applications with the ENDEVOR-C1 change control system.

CANDLE CORPORATION

Candle Corporation, the premier company for performance monitoring products in the MVS, CICS, and IMS environments, has announced OMEGAMON for DB2 that will be available in 1988. Candle will demonstrate how the OMEGAMON for DB2 product can solve common problems in DB2 processing, including users who are holding or waiting for locks and active users in DB2 and what they are doing.

CINCOM SYSTEMS, INC.

MANTIS SQL provides an alternative solution to CSP and COBOL/PL1 for application development and production in a DB2 or SQL/DS environment. This presentation will outline MANTIS facilities for screen design, test file design, on-line documentation design and implementation of embedded SQL support within the MANTIS procedural language for CICS, IMS/DC, VM/CMS or TSO environments.

COMPUTER HORIZONS CORP.

MigraData is a menu-driven DB2 Data Dictionary that is self-referential, easily modifiable and has its own tables which eliminate catalog contention. This DB2 application stores business and data modeling information, DB2 objects and corporate and external file data. MigraData is a powerful, flexible product and contains over 170 reports.

COMPUWARE CORPORATION

Compuware Corporation, a developer of quality programmer productivity tools for 15 years, will present Abend-AID for DB2. This tool provides abend analysis support, significantly reducing the time required to implement DB2 application programs. Abend-AID makes it easy for programmers to solve difficult "04E" abends and negative SQL problems.

DATA BASE MANAGEMENT, INC.

Data Base Management, Inc. (DBMI) offers instructor-led and computer-based training in DB2 and SQL/DS. The training is intended for application programmers, analysts, and designers, data base administrators, project leaders and end-users. Courses address application programming, application design, data base design and administration, Query Management Facility and Data Extract. DBMI's experience has been that training is crucial to the successful implementation of DB2.

INDEX TECHNOLOGY CORPORATION

Index Technology Corporation develops and markets the Excelerator family of products that automate the systems development life cycle. Products support strategic system planning, analysis and design of systems, project planning and a series of new interface products that provide linkages to leading application generators, data dictionaries, database management systems, and 4 GLs. DB2 is one example of such DBMS links. These products provide an extensible, flexible and integrated systems development environment for large and small projects.

INFORMATION BUILDERS, INC.

Information Builders, Inc. (IBI), developers and marketers of FOCUS, the leading fourth generation language and database management system (4GL/DBMS) will present an overview of tools for use with SQL-based relational database management systems (RDBMS). With the FOCUS 4GL productivity tools, you can easily perform data analysis and application development with the relational DBMS engine of your choice—including IBM's DB2 and SQL/DS.

INTEGRAL SYSTEMS

Integral Systems is the leading supplier of human resource software to the IBM mainframe marketplace. This session will show you how to use the following SAA components (of the common programming interface) to develop a production application system. Components include: Structured Query Language (SQL); Cross Systems Product (CSP); Query Management Facility (QMF); 1985 COBOL (COBOL II).

PRODUCT PRESENTATIONS

MANAGEMENT SCIENCE AMERICA (MSA)

Management Science America provides a complete line of financial, human resources, manufacturing, and other industry-specific application software for a wide range of operating systems and teleprocessing monitors. IBM-supported environments include MVS, VSE, CICS, IMS/DC, DB2, VSAM, and IMS/DB. MSA's Information Expert will be presented with emphasis on SQL-based capabilities and consistent access to data in multiple physical environments.

MANAGER SOFTWARE PRODUCTS (MSP)

MSP is a leading vendor of a CASE environment driven by mainframe data and information resource management technology. The MANAGER Family of Products (PC and mainframe) is dedicated to automating all phases of the systems life cycle, from strategic information planning to the generation of enabled code. MSP will be presenting the MANAGER Family of products with an emphasis on supporting the Systems Development Life Cycle in the DB2 environment.

McCORMACK & DODGE

M:SDT/DB2 is a pseudo conversational application development, query, and execution environment utilizing McCormack & Dodge's Millennium technology. Applications can be developed combining Millennium features with the capabilities of relational processing. The system includes an SQL generator, ability to access VSAM and DB2 data simultaneously, full support of IBM SQL, and full query support.

MICRO DECISIONWARE

Micro Decisionware provides decision support and cooperative processing tools to MIS and end users. PC/SQL-link is a relational database tool which provides distributed database access across mainframe/mini/microcomputers and database machines. PC/SQL-link offers a standard menu-driven user interface to SQL and multiple host/communication environments. File conversion between PC and host formats provides seamless application connectivity. PC files may be uploaded for database creation/maintenance.

MUST SOFTWARE, INTERNATIONAL

DB2 NOMAD provides seamless integration of a complete range of application development and end-user capabilities with the DB2 database engine. It offers additional relational features not found in DB2, including full referential integrity and complete support for outer joins. For improved performance, DB2 NOMAD passes functions such as sorting and aggregation to the DB2 engine, where they can be handled most efficiently.

ON-LINE SOFTWARE INTERNATIONAL

On-Line Software International presents CasePac—Automated Software Development with a powerful DB2 data dictionary. As the foundation for On-Line Software's CASE platform, CasePac provides a complete, fully active central repository, software engineering facilities including a graphics front end, change management and maintenance facilities, and the capability to use these facilities with existing systems. CasePac's integrated set of tools streamlines the entire software development life cycle.

PANSOPHIC SYSTEMS, INC.

Pansophic Systems, Inc., a leading vendor of software products to improve application productivity and control, will present TELON. The TELON application development system captures design specifications to generate COBOL or PL/1 applications for the following environments: IMS/DC, CICS, IMS/DB, DB2/SQL, VSAM, Batch. TELON assists the transition from analysis to design by providing interfaces to leading front end analysis tools.

RELATIONAL TECHNOLOGY

Relational Technology is a leading supplier of networked information management software. The company's primary product is INGRES, a distributed SQL relational database management system, which enables organizations to access data spanning a variety of computer systems connected in a network. The INGRES family of products is available for all strategic micro, mini and mainframe operating environments.

SAGE SOFTWARE, INC.

The APS Development Center family of application generators produces COBOL-based DB2 applications, offers comprehensive SQL generation and support capabilities and simplifies future maintenance. APS/DB2 Data Base Painter stores information in a "staging area" for defining, inquiring, storing, and generating to the DB2 system catalog.

SOFTWARE AG

NATURAL 2 is an integrated 4GL that includes functions for application development and end user computing. NATURAL 2 gives application developers the ability to create advanced mainframe applications unlike any they have created before. NATURAL 2 is available not only for DB2 and SQL/DS users, but also users that have mixed environments including VSAM, DL/1, and IMS/DB.

TECHNOLOGY INFORMATION PRODUCTS CORP.

Successful implementation of DB2 requires a logical/relational data model. TIP RELATE generates a consolidated 3NF relational data model for direct input into DB2. TIP RELATE automatically removes transitive dependencies, recognizes foreign keys, and creates intersection data groups. This enables DB2 users to predefine JOINS and PROJECTIONS and ensures referential integrity.

TRANSFORM LOGIC CORPORATION

The Transform product addresses the development and maintenance of the entire application life cycle. Using expert system technology, complete COBOL applications are produced for IBM mainframe DBMS's DL/1 and DB2. Transform/DB2 gives programmers without complete knowledge of DB2 access to advanced DB2 features. The program automatically generates the application logic necessary to handle referential integrity requirements of domaining, cascading deletions, and logic parentage existence.

UPDATA SOFTWARE

Updata Software develops and markets DB/ProEdit and DB/CLIST. DB/ProEdit lets application programmers use ISPF commands to generate DB2 test data quickly and easily. A FIND command and the ability to test embedded SQL with host variables are just two of DB/ProEdit's many time-saving features. DB/ProEdit is also available for SQL/DS in either ISPF or XEdit mode. DB/CLIST allows users to access DB2 from a TSO CLIST so they can develop DB2 tools quickly. DB/CLIST users also receive a complete library of productivity tools for free.

Guest Speakers

Schussel

Beyond DB2

George Schussel, President and Founder of Digital Consulting, Inc. and a noted futurist (see *Datamation*, November 15, 1987, "Applications Development in the 5th Generation") will share his thoughts on the coming five years of software to support applications development.

- the importance of distributed database technology
- how CASE will interface with relational databases
- the relative importance of DB2 on a mainframe to SQL systems on PCs
- the coming migration of workloads off mainframes and onto local net based workstations
- how to develop DB2 applications at one tenth of the cost using mainframe TSO
- the role of the DB2 repository.

Appleton

Information Asset Management

Daniel S. Appleton is President of D. Appleton Company, Inc. (DACOM). He specializes in industrial modernization and data resource management.

Mr. Appleton has published numerous technical papers and articles, and he is the most published author in *Datamation* magazine, having had more than 20 articles published.

Bachman

Re-engineering of Existing Databases

Charles W. Bachman is one of the world's foremost authorities on the architecture of information systems and is often referred to as the "father of database management."

Mr. Bachman is currently the founder, President, and CEO of Bachman Information Systems, an organization focused upon the early delivery of a software system for the support of the IBM mainframe environment.

Bohl

The Importance of Value-Added DB2 Tools

Marilyn Bohl is currently Vice President of Product Development, Digital Research Inc., Monterey, CA and has responsibility for all product development and product marketing.

Marilyn is a 19-year IBM veteran. She led DB2 product development and brought DB2 Releases 1 and 2 to market as DB2 Product Manager. IBM's corporate-wide database strategy and SQL evolved under her leadership prior to her joining Digital Research in April 1987.

Merlyn

CASE for DB2

Vaughan P. Merlyn is principal consultant of Merlyn Consulting, Inc.—an independent consulting firm. He is a recognized authority on the subject of software development automation, and the widely-acclaimed research paper "Application Development Systems—The Comparative Consumer Report."

He is currently authoring a major report about analysis/design workbench products and is also co-authoring a text book on application productivity.

van den Berg

The Relational Family and DB2 Directions

Norris van den Berg has spent an intensive career with IBM in software development and management, concentrating in both large complex systems and end-user products for business professional users.

As Manager of Data Systems Architecture and Strategy, he carries responsibility across all of IBM's operating units for architecture and strategic direction, market planning and business goals for IBM data base products.

Features of the Symposium

A strategic assessment of the DB2 TOOLS MARKETPLACE by Paul Hessinger. Categories of tools, repository implementation, the SQL issue.

Integrating CASE tools and DB2—practical research data from Vaughan Merlyn.

A statement of direction for IBM's "RELATIONAL FAMILY" by Norris van den Berg from IBM's Santa Teresa Laboratory, the "home" of DB2.

A dynamic panel discussion of the implications of SAA and Distributed Database issues moderated by Paul Hessinger with panelists representing IBM, the DB2 user community, and 2 leading RDBMS/DB2 TOOL vendors.

One-hour product presentations by leading DB2 Tools vendors, carefully organized into tracts designed to maximize attendee exposure to similar products. Each day of the symposium will focus on selected categories of DB2 Tools with an overview by Paul Hessinger on crucial technical features required for value-added DB2 TOOLS strategies.

Extensive User Case Studies for the various DB2 Tools presented during the Symposium—these case studies are being prepared by Paul Hessinger exclusively for this Symposium.

Daily debriefing sessions where attendees exchange their impressions of DB2 Tools and challenge vendors to clarify product capabilities and directions.

The various tutorials and discussion sessions conducted during the DB2 Tools Symposium will provide you with a dynamic framework for evaluating the powerful tools that will be presented during the one hour vendor sessions. Mr. Hessinger and other industry experts will be available throughout the Symposium for private consultations. Bring your existing plan to the Symposium and work with the experts to refine or redefine your DB2 strategy.

SYSTEMS APPLICATION ARCHITECTURE – FREE ONE-DAY SEMINAR

New York
April 21, 1988

Los Angeles
June 16, 1988

Today, IBM is beginning the evolution of Systems Application Architecture (SAA), a set of interfaces that will provide the foundation for communications connectivity and applications portability. DB2, IBM's flagship relational DBMS, serves as a cornerstone within SAA to support SQL-based access to mainframe databases.

This seminar will examine the SAA solution to IBM's problem of multiple hardware environments and incompatible software products. The architecture will allow a single application to run across the PS/2, System/3X, and System/370 product lines. IBM will support SQL-based RDBMSs, including DB2, SQL/DS, and OS/2 Extended Edition Database Manager, together with QMF- and CSP-like interfaces for all three SAA environments.

Objectives of this Seminar

This seminar will explain IBM's long-term strategic direction focusing on IBM's vision of how to build portable, consistent application systems. It will examine SAA's initial specification of software interfaces, conventions, and protocols that will serve as the foundation for all new IBM hardware systems and control programs, beginning with PS/2, OS/2, and DB2 Release 3. SAA will also drive future technological advancements and tools development for the DB2 environment.

By gaining an early understanding of IBM's framework for designing and developing applications with cross-systems consistency, you will be in a position to quickly ramp-up as new products and new technologies come onstream in the near future.

This seminar will introduce you to what will become the de-facto industry standard for an "application architecture." Just as DB2's SQL and the IBM PC have become overnight industry standards, it is reasonable to expect that virtually every software vendor and applications builder will jump on the SAA bandwagon. You can anticipate an onslaught of SAA-compatible products in the near future.

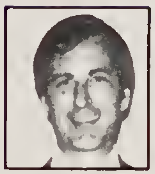
Who Should Attend

- DP/MIS managers and systems planners who need to understand the impact of SAA in order to set their own strategies.
- Application builders who must begin now to create systems that will be upwardly compatible with SAA's framework for designing and developing applications with cross-systems consistency.
- Application development managers, communications managers, and database/data administrators who will be responsible for the information infrastructure required to support SAA.

Seminar Outline

1. What is an Application Architecture and Why Is It Important?
2. SAA Overview
3. Common User Access
4. Common Programming Languages
5. Common Communications Support
6. Common Applications
7. Summary and Future Directions

Faculty


Tash

Hessinger

Jeffrey B. Tash is President and Founder of Database Decisions, Inc. Previously employed by IBM, DEC, CDC, and Arthur Young, Jeff has extensive experience in relational database management, fourth generation languages, and artificial intelligence.

This seminar was co-developed and will be co-presented by Jeff Tash and Paul Hessinger, Chairman of The DB2 Tools Symposium.

This one-day seminar is free to all 3-day attendees. Please note that substitutes will be permitted.

Proceedings

Each symposium attendee will receive a copy of "The National DB2 Tools Symposium" proceedings. This 500-page resource document includes product data sheets prepared by our consultants and detailed technical descriptions of all products written by the vendors. Your copy of the Symposium Proceedings will serve as a useful reference guide long after the Symposium is over.

Hospitality Suites

The Hospitality Suites provide an opportunity to meet one-on-one with representatives from vendor companies. There will be ample time to have your questions answered and to network with others in the industry. Enjoy the hands-on product demos and the chance to relax and share the company of fellow attendees.

Hotel Information

- New York, April 18–20, The Rye Town Hilton, (914) 939-6300
- Los Angeles, June 13–15, The Stouffer Concourse Hotel, (213) 216-5858

To Register, See Back Cover or Call (617) 470-3880.

THE DB2 TOOLS SYMPOSIUM

Two Ways To Register:
1. Call (617) 470-3880 between 9:00 a.m. and 5:00 p.m. Eastern Time.
2. Fill out and mail in the form below (including mailing label).

Registration Fees

Individual Fee, Entire 3 Days	$795
Second Registration	$695
Third Registration	$495
Fourth Registration	FREE
Fifth Registration and Over	$495

Group Attendance

Previous attendees of our Symposia have told us that the best way for companies to gain the most benefit from the program is to send two or more attendees. Our discount structure is designed to encourage multiple registrations from the same company. Have you considered sending representatives from different departments, divisions, or locations within your organization?

On-Site Seminars

We can bring many of our seminars in-house to your company. Our on-site seminars are one of the most cost-effective ways to update your managers and professionals about the leading software tools and technologies. For more information, call (617) 470-3870 and speak with our On-Site Seminar Coordinator.

Digital Consulting, Inc.

These seminars will be conducted by Digital Consulting, Inc. (DCI), a leader in the field of EDP management training. DCI is headquartered at 6 Windsor Street, Andover, MA 01810, telephone (617) 470-3870.

Cancellation Policy

Cancellations received two weeks or more prior to the Symposium will be accepted subject to a cancellation service charge of $100. Transfers to a different Symposium date or substitution will be accepted with no cancellation service charge as long as the fee is paid and the request is received before the date of the original Symposium. Registrants whose cancellation requests are not received two weeks prior to the Symposium (or no shows) are liable for the entire fee.

DCI sponsors over a total of 25 events specifically designed for Data Processing decision-makers. To receive a current catalog of DCI sponsored seminars and conferences, call (617) 470-3880.

REGISTRATION FORM

Telephone Registration

(617) 470-3880

Call 9 a.m.–5 p.m. Eastern Time
☐ Confirms telephone registration

Method of Payment

☐ Check Enclosed. Make checks payable to Digital Consulting, Inc.
☐ Purchase Order attached
☐ Bill my firm Attn. of____________________
☐ Authorized Documents enclosed

Registrants

Name____________________
Title____________________
Name____________________
Title____________________
Name____________________
Title____________________
Company____________________
Division/Branch____________________
Street____________________
City__________ State________ Zip________
Phone Number (_____)____________________
Authorized Signature____________________

☐ I do not wish to register, but please put me on your mailing list.

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The DB2 Tools Symposium

☐ 2045. New York, April 18–20, 1988
☐ 2046. Los Angeles, June 13–15, 1988

☐ YES! I will attend the free seminar.

Type of Registration

☐ **Single Full 3-Day $795**
☐ **Multiple (See Registration Fees)**
–FOURTH REGISTRATION FREE

Digital Consulting, Inc.
6 Windsor Street
Andover, MA 01810

DKWC

PLEASE DO NOT REMOVE THIS MAILING LABEL.
MAILROOM: PLEASE ROUTE this brochure to this person's manager or replacement if he is no longer employed at your company.

Relational DBMS

COMPANY	PRODUCT	OPERATING SYSTEMS	QUERY LANGUAGES SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	ACCESS CONTROL TO WHAT DATA LEVEL	PERMITS ASSIGNMENT OF USER SECURITY RATINGS	BACKUP AND RECOVERY CAPABILITIES	OTHER DATA BASE ADMINISTRATOR CAPABILITIES	APPLICATION DEVELOPMENT TOOLS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	NUMBER OF LICENSES SOLD	PRICE
Acius, Inc. **(408) 252-4444**	4th Dimension/4-D Runtime	Macintosh	Proprietary	NA	NA	Record	Yes	User implemented	4-D tool to repair, clone, cross reference, rename	Command procedural language with separate editors, screen/form editor, intuitive data base graphical structure editor	No	No	NP	$695
AD & P, Analysis, Design & Programming **(703) 790-9433**	Ultra-base	MS-DOS, Unix, Xenix, Primos, CTOS	SQL	Proprietary	Yes	Field, record	Yes	NP	Graphics, word processing, spreadsheet	Built-in code, report generator	Yes	Yes	40,000+	$595-$9,000
Advanced Business Microsystems, Inc. **(415) 689-4515**	Data Ace	MS-DOS	Proprietary	NA	Yes	Record, field, file	Yes	Backup, restore partial,entire data base	Creates, deletes, modifies files	DML	Yes	Yes	3,000	$645
Advanced Data Institute, Inc. **(916) 381-8334**	Aladin	MS-DOS	Proprietary	NA	No	Record	Yes	Import, export, restart	Graphics, statistics, word processing, creates, deletes, modifies files	None	Yes	Yes	1,200	$269-$369
Ashton-Tate Corp. **(213) 329-8000**	Dbase III Plus	PC-DOS, MS-DOS	Proprietary	NA	No	Field	Yes	None	Applications generator, report writer, forms manager	Applications generator	Yes	Yes	1.5 million + (registered packages)	$695
	Dbase IV (set for July availability)	PC-DOS, MS-DOS, OS/2	Query-by-Example, SQL	IBM SAA[1] compatible	No	Field	Yes	Full transaction processes; rollback, roll-forward recovery	Report writer, forms manager	4GL, applications generator	Yes	Yes	NA	$795 or $1,295 (developer's edition)
Advanced Microsolutions **(415) 365-9880**	SQL+	HP's Rocky Mountain Basic	SQL	ANSI	No	Record	No	Rollback	None	Command-driven interface, keyboard access	Yes	Yes	150	Starts at $995
	DBmagic	Rocky Mountain Basic	SQL	ANSI	Yes	Record	No	Rollback	None	None	No	No	100	Starts at $1,495
Amperif Corp. **(818) 998-7666**	RDM/2	Unisys 1100 Exec	SQL, proprietary	ANSI	No	Data item, value	No	Backup to host or back-end tape	Data base dump/load; user identification, authorization	None	No	No	NP	$280,000-$300,000
Applied Data Research, Inc. **(201) 874-9000**	Datacom/DB	IBM MVS, MVS/XA, VM/CMS, VSE	SQL, proprietary	ANSI	Yes	Field, record, file	Yes	Full backup recovery	Performance monitoring, tuning, data modeling, accounting, data base operations	Ideal, for building, executing on-line, batch data base applications	Yes	No	1,600	$92,000-$160,000
Blyth Software, Inc. **(415) 571-0222**	Omnis III Plus	Macintosh	None	NA	NP	Record	Yes	None	Master password protection, report writer, field generator	4GL, applications generator	Yes	Yes	NP	$575
	Omnis Quartz	MS-DOS	None	NA	NP	Record	Yes	None	Master password protection, report writer, field generator	4GL, applications generator	Yes	Yes	NP	$795
Boeing Computer Services, Inc. **(206) 865-3660**	Boeing Rim	VMS, MVS, VM, NOS	Proprietary	NA	Yes	Field	Yes	Transaction logging, rollback	Report generator, screen formatter	None	No	No	450	$6,000-$25,000
Borland International **(800) 543-7543**	Paradox 2.0	MS-DOS, PC-DOS	Query-by-Example	NA	Yes	Field	Yes	Table recovery	Multicolumn reports; label generation; table, record-locking channels; program editor	Programming language, applications generator	No	Yes	NP	$725
	Paradox 386	MS-DOS, PC-DOS	Query-by-Example	NA	Yes	Field	Yes	Table recovery	Multicolumn reports; label generation; table, record-locking commands; program editor	Programming language, applications generator	Yes	Yes	NP	$895
Brock Software Products, Inc. **(815) 459-4210**	Brock Keystroke Relational Data base	Macintosh	None	NA	No	File	Yes	Rebuild function, floppy backup	Label, report printing, merge utilities, batch updating	None	No	Yes	Approx. 480	$49-$149
Campus America, Inc. **(615) 523-9506**	Poise DMS-Plus	VAX/VMS, RSTS, PC-DOS, MS-DOS	Proprietary	NA	Yes	Record, field, file	No	None	Report writer, forms, screen generation; labels	Proprietary file access routines	Yes	Yes	420	$495-$25,000
Century Analysis, Inc. **(415) 680-7800**	CFMS	NCR VRX, VRX/E	Proprietary	NA	Yes	Field	Yes	Event rollback	Report writer	Screen generator, interactive file maintenance	Yes	Yes	50	$8,000-$40,000
Chang Laboratories, Inc. **(800) 972-8800;** **(800) 831-8080 in Calif.**	C.A.T.	Macintosh	Proprietary	NA	No	File	Yes	None	Controls dictionary,design of files, fields	None	Yes	No	12,000	$399.95
Cincom Systems, Inc. **(513) 662-2300**	Supra	MVS/SP, MVS/XA, DOS/VSE, VSE/SP, VM/CMS	Proprietary	ANSI (in development)	Yes	Field	Yes	Automatic system, transaction-level recovery	Data base design, generation; interactive relational view development, testing; on-line, batch directory maintenance	4GL (Mantis)	Yes	Yes	350+	$77,000-$499,000
	Ultra	VMS	Proprietary	ANSI (in development)	Yes	Field	Yes	Automatic system, transaction-level recovery	On-line directory maintenance; interactive relational view development, testing; high speed data file maintenance	4GL (Mantis)	Yes	No	300	$20,000-$99,000
Cognos **(800) 4-COGNOS**	Powerhouse	VAX/VMS, DG AOS/VS	Proprietary	NA	Yes	File, field, record	Yes	Uses backup utilities of RDB/VMS, DG/SQL	Dictionary maintenance, reporting	Proprietary development language	Yes	No	9,000	NP
Command Business Systems, Inc. **(800) 223-2942;** **(714) 259-7531 in Calif.**	Structure/4	Primos, VAX/VMS	Proprietary	NA	Yes	Record	Yes	None	Data dictionary, complete data structure listings, report writer	4GL screen generators; maintenance, data generator	Yes	Yes	150	$16,900-$26,500
Compuserve Data Technologies **(617) 661-9440**	System 1032 4GL/DBMS	VAX/VMS	Proprietary	NA	Yes	Record	Yes	True VMS backup journaling, rollback	Not required	System 1032/AF application generator	Yes	Yes	720	$3,000-$56,000
Computer Associates International, Inc. **(800) 343-4133**	CA-Universe	MVS, MVS/XA, DOS/VSE, VM/CMS	SQL, QUEL	ANSI	Yes	Field	Yes	Import, export, restart	Data modeling, statistic monitoring	UIMS — includes generator, editor, driver, 4GL	Yes	Yes	300+	$84,000-$238,000
Computer Corporation of America **(617) 492-8860**	Model 204 DBMS	MVS, MVS/XA, VM/CMS, DOS/VSE	Proprietary	NA	Yes	File, field, record	Yes	Full, transaction backup; system, media recovery	On-line monitoring,tuning, parameterized configuration, file loading	4GL, applications generator, menu-driven prototyping tool	No	No	600	$30,000-$200,000
Computer Representatives, Inc. **(408) 980-9898**	Relate/DB	AOS/VS, VAX/VMS, MPE	SQL	Proprietary	Yes	File, field, record	Yes	Logging, recovery	Report writer, graphics interface, 4GL, restructuring, reorganizing	Procedural 4GL	No	Yes	600	$15,000-$90,000

[1]Systems Application Architecture [2]Computer-aided systems engineering [3]Data base management system [4]Random-access memory [5]Artificial intelligence

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	OPERATING SYSTEMS	QUERY LANGUAGES SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	ACCESS CONTROL TO WHAT DATA LEVEL	PERMITS ASSIGNMENT OF USER SECURITY RATINGS	BACKUP AND RECOVERY CAPABILITIES	OTHER DATA BASE ADMINISTRATOR CAPABILITIES	APPLICATION DEVELOPMENT TOOLS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	NUMBER OF LICENSES SOLD	PRICE
Conceptual Software, Inc. **(713) 667-4222**	Prodas	MS-DOS, PC-DOS, Unix, VAX/VMS	None	NA	Yes	Field	No	Backup copies of files	Report writing, sorting, statistics, graphics	None	Yes	Yes	600	$720-$2,520
Concurrent Computer Corp. **(800) 631-2154**	Reliance Plus	OS 32	Proprietary	NA	Yes	Field	Yes	Transaction roll-forward, rollback, transaction logging	Monitoring, simulation, report generator	4GL	Yes	Yes	300	$10,000-$30,000
Condor Computer Corp. **(313) 971-8880**	Condor 3 Release 2.20	PC-DOS, MS-DOS	Proprietary	NA	Yes	None	No	Automatic audit trails	Report writer, statistics, full mathematical functions	Creates menus; import, export ASCII files; 4GL	No	No	200,000	$495
Cosmic, the University of Georgia **(404) 542-3265**	Rim5	VAX/VMS, Primos, CDC Cyber 170 series NOS, NOS/BE	Proprietary	NA	No	File, field, record	Yes	None	Password protection on files, commands; report writer	Complete source code	Yes	Yes	NA	$3,000
Cullinet Software, Inc. **(800) 551-4555**	IDMS/SQL	VAX/VMS	SQL	ANSI	Yes	File, field, record	Yes	On-line dynamic backup, automatic restart	Utilities to load, unload data; define, delete logic file names; check status of journal file; handle unexpected data base terminations	Application generator	Yes	Yes	NA (in beta-testing)	$1,000-$196,000
	IDMS/R	MVS/DOS NSE, VM/CMS, Siemens BS2000, Fujitsu MSP for Facom-M line	SQL, proprietary	ANSI	Yes	Field	Yes	Automatic rollback, warm-start	Backup, restore; load, unload; rollback, roll-forward	CASE^{2}, expert systems, 4GL, Cobol, Fortran, PL/1, assembler precompilers	Yes	Yes	2,400+	$104,000-$390,000
Data Access Corp. **(305) 238-0012**	Dataflex 2.3	Supports more than 30 operating systems	Proprietary	NA	Yes	Field	No	Reindexing utility (allows user to recreate damaged indexes)	Modifies data dictionary, user-saved queries; modifies, recreates indexes; creates reports; allows for ad hoc queries; reindexes post processing facility	Program editor, compiler, applications generator	No	No	100,000	$695 (single user), $1,250 (multiuser), $1,800 (VAX/VMS, Unix V version)
Data General, Corp. **(800) DATAGEN**	DG/SQL	AOS/VS	SQL	ANSI	Yes	Table, record, field	Yes	Archive backups, undo/redo logging for rollback/ roll-forward	Data Definition and System Administrators Utility	Powerhouse (Cognos 4GL), present-interactive query, graphics, report writer	Yes	No	NP	$1,390-$17,400
Dataease International, Inc. **(203) 374-8000**	Dataease	MS-DOS, CTOS, BTOS	Proprietary	NA	Yes	Field, record, file, menu	Yes	Import, export; backup, restore of data base	Assigning user passwords, menus; hardware, configuration set up; printer communications	Applications generator	Yes	Yes	150,000	$600 (single user), $700 (multiuser)
DB/Access, Inc. **(408) 255-2920**	Enhansys	VMS, VM, Tandem Guardian	SQL, proprietary	ANSI	Yes	File	No	Table replacement	File mapping, linkage, menu system	4GL	No	No	40	$10,000-$49,000
Dialogue, Inc. **(212) 425-2665**	Analect/Rim	VAX/VMS, VM/CMS, Primos	Proprietary	NA	Yes	Relation	No	Transaction logging, rollback	Modeling, report writer, graphics, forecasting, statistics	4GL, screen control	No	No	15	$2,500-$60,000
Digital Equipment Corp. **Contact your local DEC dealer**	VAX RDB/VMS (Relational)	VAX/VMS	Information Builders' Focus; Smartstar; Cognos' Powerhouse	ANSI	Yes	Field	Yes	VMS backup for full data base backup; transaction rollback; before/after image journaling with roll-forward, rollback recovery	Statistics, dump, monitor, backup, restore, change, define, convert	Application generator, 4GL, SQL	Yes	Yes	5,500	NP
Empress Software, Inc. **(416) 922-1743**	Empress with M-Builder	Unix, VMS, MS-DOS	SQL	ANSI	Yes	Record	Yes	Transaction logging, warm restart, backup recovery	Field deleting, modifying, report generator	4GL (M-Builder)	Yes	Yes	3,500	$1,750-$100,000
Exact Systems & Programming Corp. **(914) 285-9444**	DNA-4	AOS/VS, AOS, RDOS	Proprietary	NA	Yes	Field	Yes	Transaction logging	Defines logical files, maintenance of data dictionary	4GL	Yes	Yes	150	$1,250-$36,000
1st Desk Systems, Inc. **(800) 522-2286;** **(617) 533-2203 in Mass.**	1stFile	Macintosh	Proprietary	NA	No	NA	NA	None	None	None	Yes	No	20,000	$95
	1stFile 4.0	Macintosh	Proprietary	NA	No	NA	NA	None	None	Run macro documents created by 1stTeam	Yes	No	500	$295
	1stTeam	Macintosh	Proprietary	NA	No	Record, file, field	NA	File copy	None	Takes manual repetitve tasks; plays back automatically	Yes	No	20	$795
Fox Software, Inc. **(419) 874-0162**	Foxbase +	MS-DOS, PC-DOS, Macintosh	Proprietary	NA	No	Record, field, file	No	None	None	Supports any program written in Dbase	Yes	Yes	30,000	$395
General Data Systems, Inc. **(215) 985-1780**	GDX	MVS, VSE, MS-DOS, Intel IRMX	Query by form	NA	Yes	Field	Yes	Roll-forward, rollback, warm start	Group deletes, reformats; unload, reload utilities; data dictionary driver; users can create own utilities	Application generator, 4GL	Yes	Yes	15	$2,500-$180,000
Henco Software, Inc. **(617) 890-8670**	Info-DB+	VAX/VMS	Proprietary	NA	Yes	Item	Yes	None	Add/changes security classes	4GL	No	Yes	60	$4,500-$165,000
Hewlett-Packard Co. **Contact local HP sales office**	Allbase-HP SQL	HP-UX, MPE	SQL	ANSI	Yes	Field, record	Yes	Roll-forward, recovery, single, dual logging	NP	4GL (HP Today), query/reporting (HP Visor)	No	No	NP	NP
Honeywell Bull, Inc. **(800) 328-5111 ext. 99**	Interel	GCOS 8	SQL, proprietary	ANSI	Yes	Data base, column, row	Yes	Operating system	Bulk load of data utility, model generation, statistical analysis, data extract	Cobol, Infoedge (proprietary tool kit)	No	No	NP	$8,000-$14,000 (original license fee)
IBM **Contact local IBM sales office**	OS/2EE	OS/2	SQL, prompted query	ANSI, SAA	Yes	Data base	Yes	Full, selected backup; restore to state of last backup; load, unload table output; warm restart; commit, rollback functions	Full, selected backup; restore to state of last backup; load, unload table output; table reorganization; import, export between data base manager tables, other OS/2 files; conversion to, from ASCII, WKS, WRK, WR1; update catalog with data base statistics	Report generator, IBM C/2 language	No	Yes	Version 1.0 set for availability in July; Version 1.1 in November	$795
	DB2	MVS/XA, MVS/370	SQL, QBE	ANSI, SAA	Yes	Field	Yes	On-line full, partial backup; on-line recovery to current time or point-in-time; conditional, point-in-time restart; two-phase commit, recovery; restart with IMS/VS, CICS	On-line load, reorganization; update of DB2 catalog statistics; full-screen support for executing SQL statements; accounting, statistics, service, performance traces; DB2 performance monitor; data base record editor; application directory tables	4GL, application generator, application directory, report writing, query, graphics, data base input, editing applications	No	Yes	NP	$93,625-$149,800 (First license-OTC)
	SQL/DS	VM/IS, VM/SP, VSE/Advanced Function	SQL, QBE	ANSI, SAA	Yes	Field	Yes	On-line data base, log archives; recovery to current time or point-in-time; warm restart; two-phase commit, recovery, restart with CICS; commit, rollback functions	Data load, unload; reorganization; process batch SQL statements; on-line update of SQL/DS catalog statistics; interactive SQL; accounting, rudimentary security audit; problem determination traces; relational design tool, data base record editing	4GL, application directory; report writing; query, graphs, data base input, editing	No	Yes	NP	$8,700-$34,800 (First license-OTC)

COMPANY	PRODUCT	OPERATING SYSTEMS	QUERY LANGUAGES SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	ACCESS CONTROL TO WHAT DATA LEVEL	PERMITS ASSIGNMENT OF USER SECURITY RATINGS	BACKUP AND RECOVERY CAPABILITIES	OTHER DATA BASE ADMINISTRATOR CAPABILITIES	APPLICATION DEVELOPMENT TOOLS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	NUMBER OF LICENSES SOLD	PRICE
Infocom, Inc. (617) 576-1851	Cornerstone	MS-DOS	None	NA	No	None	No	Backup, restore	Update, change records; report generator	None	Yes	Yes	NP	$99.95
Information Builders, Inc. (212)736-4433	Focus	VM, MVS	SQL, proprietary	ANSI	Op-tio-nal	Field	Yes	Absolute file integrity	Access command control, encryption, password assignment, display control, program accounting	Application generator	Yes	Yes	2,200	$50,000-$100,000
Information Dimensions, Inc. (800) DATA MGT	DM	VMS, NOS/VE	Proprietary	NA	Yes	Field	Yes	Backup, restore data base; lists contents of backup sets	Communications control facility; data base dump, extract; report writer; dump, reload; query, manipulation, journal processor; kernel monitor utility; trace record utility	Cobol, Fortran precompilers; form view development module	Yes	Yes	175	$17,400-$96,000
Information Resources, Inc. (617) 890-1100	Express	IBM VM; Primos	Proprietary	NA	Yes	File, field, record	Yes	Update command backs up all changes	Data reader, dictionary manipulation	Menu generator; procedural, nonprocedural 4GL	Yes	Yes	175	$85,000 +
	Express MDB	IBM VM, MVS; Primos; DEC VMS; HP MPE/XL	Proprietary	NA	Yes	File, field, record	Yes	Update command backs up all changes	Data reader, dictionary manipulation	Menu generator; procedural, nonprocedural 4GL	Yes	Yes	10	$100,000 +
Information Structures, Inc. (303) 293-2911	Base/OE	VMS, RSX	Proprietary	NA	Yes	File	Yes	Operating system backup	File copy, file restructuring	Screen generator, proprietary application programming language	Yes	Yes	30	$13,500-$36,000
Informix Software, Inc. (415) 322-4100	Informix SQL, Informix 4GL	Unix, DOS, VMS, OS/2	SQL	ANSI	Yes	Fiel, field, record	Yes	Transaction logs	Audit trails, index file checker	Forms generator, report generator, ad hoc query capabilities (Informix 4GL can create screens, reports, menus, windows)	No	No	NP	$795 (Informix-SQL), $995 (Informix-4GL)
Intelligent Information Systems, Inc. (212) 966-4468	IIS/Destiny	VAX/VMS	Proprietary	NA	Yes	Field, key	Yes	On-line recovery, transaction rollback	Loader to transfer Destiny, RMS files	4GL, symbolic debugger	Yes	No	12	$3,600-$40,000
Interactive Software Systems, Inc. (800) 962-8367; (303) 987-1001 in Canada	UDMS	VMS	Proprietary	NA	Yes	Field	Yes	None	Dictionary, extracts, imports, interface to other relational DBMSs[3]; report generator	4GL	Yes	Yes	300+	$2,500-$15,300
Interactive Technology, Inc. (503) 644-0111	RDM: The Application Developer	VMS, RSTS/E, RSX, RSX11M+, MicroRSX, TSX+, RT-11, P/OS, MS-DOS	Query by form, query by interactive process	NA	Yes	File, field	Yes	NP	Copy, extract, merge, purge, expand, delete, rename, sort, ASCII conversion, Help files	Nonlanguage application developer; create files, forms, reports, data manipulation processes, menus, commands, Help files	No	No	2,000	$895-$89,995
Interbase Software Corp. (617) 649-3977	Interbase	VMS; Ultrix; SUN SunOS; Apollo Aegis; Domain/IX	SQL, proprietary	ANSI	Yes	Field	Yes	Backup, recovery utility	Backup, recovery utility	4GL, forms editor, preprocessor	Yes	Yes	800	$5,000-$75,000
Landmark Software Systems, Inc. (201) 722-5100	X-ample	VMS	Proprietary	NA	Yes	Field, file, record	Yes	Load, unload; index consistency; failure recovery	Import, expoert to RMS file structures	Menu, screen, report generators	Yes	Yes	NP	$20,000-$60,000
Macon Systems, Inc. (719) 520-1555	ADBM	MS-DOS	Query-by-Example	NA	Yes	File, field, record	Yes	Internal backup, damaged file recovery	File creation, deletion, update, report generator, statistical analysis	Import file structures	Yes	Yes	6,000	$99-$2,500
MDBS, Inc. (800) 344-5832	Knowledgeman/ 2	PC-DOS, MS-DOS, VMS	SQL	Proprietary	Yes	File, field, record	Yes	NP	NP	Spreadsheet, graphics, text processing, report generator, forms management	No	No	20,000	$595
Microrim, Inc. (206)885-2000	R:Base	DOS	Proprietary, SQL	ANSI	Yes	Table, row, item	Yes	Load, unload, reload, verify integrity of data base	Network administration	Reports, forms, applications generators	Yes	No	NP	$725-$2695
	R:Base for OS/2 (available by March 31)	OS/2	Proprietary, SQL	ANSI	Yes	Table, row, item	Yes	Load, unload, reload, verify integrity of data base	Network administration	Report, forms, applications generator	Yes	No	NP	$895
Nantucket Corp. (213) 390-7923	Clipper	MS-DOS	None	NA	No	File, field, record	Yes	File copy	Create, edit data base files; indexes, views; prototyping Clipper commands	Report, label form generator	No	No	NP	$695
	McMax	Macintosh	None	NA	No	File, field, record	Yes	Backup, restore programs via programming language	Report, label generator	Report, label generator; resource editor; resource compiler; text editor	No	No	NP	$295
National Information Systems, Inc. (408) 985-7100	Accent'r	VMS, TOPS 20, 10	Proprietary	NA	Yes	File, record, field	No	Programmable to users' needs	File renaming, programming language, report writer	Built-in programming language, program generators	Yes	Yes	300	$5,000-$99,000
Novell, Inc. (512) 346-8380	XQL	MS-DOS, PC-DOS, DOS 3.0, 3.3 LANS	SQL	Partial ANSI standard	Yes	Field	Yes	Proprietary	Proprietary	Proprietary	No	Yes	3,000	$795
Odesta Corp. (800) 323-5423; (312) 498-5615 in Ill.	Helix VMX	VAX/VMS, Macintosh	Query by form, query by field	NA	Yes	File, field, record	Yes	Logging, autosave, save as, revert to previous save	User permissions; form permissions; validation; submenus; custom, design modes	5GL	Yes	Yes	NP	Starts at $4,500
	Double Helix II	Macintosh	Proprietary	NA	Yes	File, field, record	Yes	Logging, autosave, save as, revert to previous save	User permissions; form permissions; validation; submenus; custom, design modes	5GL	Yes	Yes	NP	$595
Online Software Systems, Inc. (800) 642-0177	Ramis Information System	OS, DOS/VSE, VSE/SP2.1, MVS/TSO, MVS/XA, VM/CMS	Proprietary	NA	Yes	Data base, file, record, field	No	None	Data maintenance; on-line error analysis; full-screen editor to create, modify, validate file descriptions	Structured development language; tool kit for creating, maintaining files; file descriptions; data dictionaries; libraries; procedures, screen, report requests; includes formatted screen manager to build screen-based applications	No	Yes	1,200	$30,000-$126,000
	Ramis/PC Workstation	PC-DOS, MS-DOS	Proprietary	NA	Yes	File	No	None	Menu-based transaction processing; automated DOS utilities for directory, file management; encryption, decryption	Integrated development language; screen painting, interface for uploading, downloading; utility for developing relational fileset procedures that run on PC, mainframe	Yes	Yes	3,000+	$495
Oracle Corp. (800) 345-DBMS	Oracle	MS-DOS, OS/2, Unix, Ultrix, VMS, MVS, AOS, Xenix, VM	SQL	ANSI	Yes	File, field, record, value	Yes	Roll-forward, rollback recovery	Export, import SQL*Loader, monitoring tools	Forms, report, menu generator	Yes	Yes	70,000	Starts at $199

COMPANY	PRODUCT	OPERATING SYSTEMS	QUERY LANGUAGES SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	ACCESS CONTROL TO WHAT DATA LEVEL	PERMITS ASSIGNMENT OF USER SECURITY RATINGS	BACKUP AND RECOVERY CAPABILITIES	OTHER DATA BASE ADMINISTRATOR CAPABILITIES	APPLICATION DEVELOPMENT TOOLS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	NUMBER OF LICENSES SOLD	PRICE
Prime Computer, Inc. (617) 655-8000	Prime Information	Primos, Unix, DOS	Proprietary	NA	Yes	Field	No	On-line transaction logging, roll-forward recovery, tape or disk backup	File sizing without tape restore; globally accessed, RAM[4] disk data base; new field addition in real time; real-time index creation	Simple (menu-based development tool), Escape (application code generating, documenting language)	Yes	No	5,000+ (multiuser version), 6,000+ (DOS version)	$895 (DOS), $3,000-$35,000 (multiuser)
	Prime Oracle	Primos, Unix, MS-DOS	SQL	ANSI	Yes	Field	No	Rollback after image journaling; dynamic or static creation at AI[5] files; import, export utility	Reorganization, restore capability; Oracle diplay system to track locking bottlenecks; data loader to load flat files into data bases	ProOracle, PRO*SQL, SQL*Forms, SQL*Plus	Yes	No	500+	$1,000-$92,000
Progress Software Corp. (617) 275-4500	Progress	Unix, PC-DOS, VAX/VMS, Xenix, Ultrix, CTOS/ BTOS	Proprietary	ANSI (in development)	Yes	Field, record	Yes	Crash-proof data base engine, before image filing, roll-forward recovery, backup utilities	Data base analysis, index rebuild, I/O analysis	4GL	Yes	Yes	10,000+	$1,000-$125,000
Provue Devlopment Corp. (714) 969-2431	Overvue	Macintosh	None	NA	No	None	No	Hard-disk backup	Report writer, charts	None	No	Yes	Approx. 10,000 shipped	$295
Quodata Corp. (203) 728-6777	QDMS-R	VAX/VMS	Proprietary	NA	Yes	Field	Yes	Error recovery through VMS	Describes data elements (up to 26 attributes), defines relationships between tables, allocates space, report writer	Screen generator, generalized data entry; mass change, delete, add; letter generator	Yes	Yes	NP	$16,000-$25,000
Relational Technology, Inc. (800) 4-INGRES	Ingres	DOS, VMS, VM/CMS, Unix, MVS	SQL, QUEL	ANSI	Yes	Field, time, data, value range	No	Checkpoint, journaling, rollback, roll-forward	Storage structure modification, data relocation	Ingres (4GL)	Yes	Yes	6,500	$5,000-$160,000
Rim Technology, Inc. (206) 451-8144	RTI Rim	Ultrix, VMS, Unix, MS-DOS, NOS/VE, Aegis, AOS/VS, Cray COS	Proprietary	NA	Yes	File, record	Yes	None	Removing users, setting user access, recovering deleted file space, recovering deleted rows, repairing damaged file structures	Application interface	Yes	Yes	100	$700-$13,000
Ruf Corp. (913) 782-8544	Information Management Processing and Reporting System	VMS, RSTS	Proprietary	NA	Yes	Record	Yes	Transaction logging	Join, merge restructure files; delete records; delete columns; reformat data; add indexes	Data manipulation language	No	Yes	300	$6,000-$20,000
Smith, Abbott & Co. (301)561-8411	Autopro	RSTS/E, VMS, MS-DOS, Novell Netware	Query-by-form	NA	Yes	Field	Yes	Audit trails, change logging	File creation, deletion; data base add, delete, modify; report writer	Screen generator, menu generator, query-by-form	Yes	Yes	200+	$750-$15,000
Software AG of North America, Inc. (703) 860-5050	Adabas	VM SP 4, SP 5, DOS, VSE SP 1.3, SP 2.1, SP 3.1, MVS/XA, VS1; VMS; Semiens BS2000; Futjitsu OS IV; Hitachi VOS	SQL	Proprietary	Yes	File, field, value	Yes	Save, restore; walk forward, backup functions	Load, unload; compress, decompress; save, restore; define data base; format space; file maintenance; data base maintenance	Editors, screen generators, debugging aids, CASE-aided application life cycle support, SQL-based syntax for 3GLs	Yes	Yes	2,500	$25,000-$186,000
The Software Group, Inc. (518) 877-8600	Enable	DOS	None	NA	No	File, field, record	No	Automatic data base backup, restore	Add, edit, display, sort, merge, archive, delete, undelete, destroy, update, copy, browse, report, export, replace, index, graph, rename	Menu generator, procedural language for data base applications	Yes	Yes	NP	$695
Stone Edge Technologies, Inc. (215) 641-1825	DB Master Version 5 Professional	Apple II PRO DOS	None	NA	Yes	File, field	Yes	None	Report generator, statistics, password settings, data exchange with other file types, data merge, global edit, file restructure	NA	Yes	Yes	NP	$295
Sun Microsystems, Inc. (415) 960-1300	Sun Unify	Unix	SQL	ANSI	Yes	Field	Yes	Backup, roll-forward recovery	Table statistics, schema access, specify disk layout	NP	Yes	Yes	1,000	$3,195
	Sun Ingres	Unix	SQL, proprietary	ANSI	Yes	Record	Yes	Rollback, roll-forward recovery	Data base backup to disk or tape; journaling; restore data base after hard, soft crashes; modify data base structures; allowing network access; copy data base	Applications by form, C, Fortran	No	Yes	1,000	$3,990
Sybase, Inc. (415) 548-4500	Sybase System, Dataserver, Datatoolset	VAX/VMS, Sun/Unix, Pyramid OSX (Dataserver), VAX/VMS, Ultrix, Sun Unix, Pyramid OSX, PC-DOS (Datatoolset), OS/2 (Sybase system in second half of 1988)	SQL	ANSI	Yes	Field	Yes	Physical logging; multiple data base support; controllable guaranteed recovery time; log recovery; bulk copy program; journaling; table generator; monitoring tools; resource control; maintenance tools; consistency cbecker	Integrity control through stored procedures, configuration management, performance tuning	Proprietary toolset; Information Builders' Focus; DB Access's Access/Star; Network Innovation's Multiplex; Natural Language, Inc.'s NLI Datatalker	Yes	Yes	350	$1,000-$150,000
Synercom Technology, Inc. (713) 240-5000	Informap III	VMS	Proprietary	NA	Yes	File	Yes	NA	NA	User creatable	Yes	Yes	160	$1,500-$80,000
Tandem Computers, Inc. (408) 725-6000	Nonstop SQL	Guardian (proprietary)	SQL	ANSI	Yes	Record, file	Yes	Transaction monitoring; backup, restore programs	Where-used reporting; performance monitoring; data base conversion; disk compression; disk space analysis	Screen generator; transaction processing monitor	No	No	NP	$4,000-$8,000 (initial license fee)
3CI, Inc. (800) 525-2001	Infocen	VMS, AOS/VS, Primos, GCOS 8, OS/32	SQL	Proprietary	Yes	Field	Yes	Checkpointing; autorecovery; logging, journaling file access control; system accounting; file access control	Change data set characteristics, rebuild dataset structures, control security, performance analysis, data base tuning	Macro/4GL builder; forms generator; painted forms; report writer; graphics, import, export utility; 3GL applications library; network module; command prompter; Help facility; load, off-load utilities	Yes	Yes	100+	$4,900-$169,000
Unify Corp. (916) 920-5553	Accell IDS	Unix, Xenix, all Unix compatible	SQL	ANSI	Yes	Field	Yes	Transaction logging, data base backup, roll-forwared recovery	Security maintenance; data dictionary reports; utilities to maintain executable menus,Help documentation	4GL, windowing interface, applications generator, host language interface	Yes	Yes	50,000	$2,995-$120,000
	Unify relational DBMS	DOS, Unix, all Unix compatible	SQL	ANSI	Yes	Field	Yes	Transaction logging, data base pickup, roll-forward recovery	Security maintenance; data dictionary reports; utilities to maintain executable menus, Help documentation	Data entry, query-by-forms, report writer, custom-formatted listings, full-screen editor for screen forms	Yes	Yes	200,000	$795-$80,000
Unisys Corp. (215) 542-4187	UDS RDMS 1100	Unisys Series 1100/2200	SQL	ANSI	Yes	File, field, record, table, view	Yes	Duplexed file, audit trial options; optional check-sum feature; automatic tape backup	Statistics, performance analysis; automated application recovery; fast dump, load; on-line duplexed file leg reconstruction; file placement for performance	SQL integrated with Cobol, Fortran, C compilers; 4GL; Interactive Programming Facility for SQL prototyping, design	Yes	Yes	NP	NP
Wang Laboratories, Inc. (617) 459-5000	Pace	VS	Query-by-Example, SQL	Proprietary	Yes	Field	Yes	Backup at data base, file levels; before-image journaling; rollback, roll-forward recovery	Copy table definitions, control file conversions	Application builder; data dictionary facility to define processing, integrity rules in data dictionary	Yes	Yes	2,000	$13,000-$39,000
Wordperfect, Corp. (801) 227-5000	Dataperfect	MS-DOS	None	NA	Yes	File, field	Yes	Regenerates indexes, file copy	Proprietary language used to build or modify a structure	NA	Yes	Yes	NP	$595

Differences in dictionaries

BY V. VENKATAKRISHNAN

Interest in data dictionaries is on the upswing again. There are a variety of reasons for this revival, but chief among them is the dawning awareness that the key to productivity is effective integration of tools from multiple vendors.

A basic requirement of this necessary integration is a powerful and flexible cross-referencing facility, which is offered by good dictionary software. The dictionary documents the data resources independently of hardware, software or organizational structure. These resources typically include instruments of process — such as systems, programs and modules — and instruments of information — such as data bases, traditional files in machine-readable or manual form and individual data items.

The totality of interactions between these two types of instruments characterizes the information environment of the enterprise. The data dictionary acts as an automated tool for standardizing and controlling the definitions of, and relationships between, the instruments of process and the instruments of information.

Providing resource information

One of the primary benefits of a data base management system is optimization of data sharing through minimization of unplanned redundancies. But a DBMS by itself is not capable of identifying data resource usage. Only a data dictionary can provide this information. For this reason, dictionary packages provide interfaces to external software such as DBMSs.

All data dictionaries offer interfaces, but the design of those interfaces can considerably vary from tight to loose, and the differences govern both the character of the dictionary and the role it plays in data management.

Some dictionary packages, such as Datamanager from MSP, Inc., interface with many commercial DBMS products but do not require an installed DBMS to function. These are passive.

Other DBMSs are active and require, implicitly or explicitly, the installation of a specific brand of DBMS. For example, Cullinet Software, Inc.'s Integrated Data Dictionary (IDD) requires Cullinet's IDMS/R and is central to the development and operation of IDMS/R applications.

A passive dictionary serves as a repository. An active dictionary serves as a directory and controls the execution of a DBMS or another operational tool.

There are advantages and disadvantages to both kinds of dictionaries. The general or passive package can be used in a non-DBMS environment. It offers flexibility when migrating to a DBMS environment or from one DBMS to another. But it is not tightly integratable with any DBMS. Human intervention is required to decide whether or how to use the interface with the DBMS.

Active dictionaries are tightly integrated with a specific DBMS; in some cases, like IDD, the DBMS is driven by the dictionary.

The obvious problems are that users may not need or want a DBMS or the specific brand of DBMS bound to the dictionary. Or they may want to have the flexibility to change the DBMS and not the dictionary. If any of these is true, then extra caution is required when selecting dictionary software (see chart above).

A third class of dictionary may be classified as DBMS bound. These are not active in the sense that they are not required for the operation of the DBMS. Nevertheless, they require a brand of DBMS to function.

Both the passive and active dictionary roles are vital to a successful operational environment. For data modeling, business definitions and cross-referencing, a passive dictionary is unbeatable and highly desirable.

But fourth-generation languages require an active directory, and application development using SQL or expert systems also requires some form of directory to store parsing structure or knowledge objects. In fact, a well-designed directory system can provide for the integration of data bases and knowledge bases.

No requirement, however, mandates that a single piece of software perform in a dual capacity. In fact, the best possible route for a multivendor installation today seems to be a passive dictionary in conjunction with the directories now routinely built into DBMSs and fourth-generation languages.

As for the directory, each DBMS has one. It is a fairly simple technical task to interface the passive dictionary and the active directory either by acquiring vendor software or following homegrown procedures.

Such a strategy offers both short- and long-term benefits. The major short-term benefit is that the data resource can be administered effectively without cluttering directories with unnecessary text-like descriptions.

A smaller directory makes for better production performance. Furthermore, when a problem arises in production, a smaller directory can be handled faster than a large dictionary/directory containing data not relevant to production.

The primary long-term advantage is that users retain the flexibility to change DBMSs and other tools without redoing or converting data definitions.

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• Changing the DBMS environment involves changing the dictionary environment as well	• Provides flexibility in migrating to a DBMS environment or when changing the DBMS environment
• Tightly integrated with a specific DBMS package	• Loosely integrated with several DBMS packages
• Results in multiple dictionary tools; organizational data definitions can get fragmented	• Provides a single repository in managing a heterogeneous DBMS environment; all the organizational data definitions are in one place

CW CHART

Venkatakrishnan is a data base consultant with Aetna Life and Casualty Co. in Hartford, Conn.

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Smoothing the data administration path

BY PAUL WINSBERG

When the data administration function first emerged early in this decade, many saw the creation of a position charged with control and management of corporate data as the force that could bring order to the balkanized world of corporate data processing.

Winsberg is a senior consultant at the Codd and Date Consulting Group in San Jose, Calif. He specializes in data base design and the computer-aided systems engineering software marketplace.

In some cases, the promise has been fulfilled, but many data administrators have met only with delay or failure.

One reason for the difficulty may be the sheer size and complexity of the body of information data administrators must manage. Another may be the dual mission assigned to them, which encompasses enforcement of standards and user support. The enforcement function interferes with the support one, ultimately disrupting both.

Still another, and possibly the most important, reason for the generally poor performance of data administration is that data administrators and data base managers speak different languages.

Semantics vs. symbolics

The vocabulary of the data administrator is built around entities, relationships and attributes — that is, a semantic model. The data base manager, on the other hand, implements the semantic model as tables, records, fields and links — in short, a symbolic model.

As a result, the work of the data administrator does not directly materialize as an active, on-line data base. At best, a dictionary documents the correspondence of entities to tables, attributes to columns and so on. More likely, the semantic model and active data base are incompatible. In either case, the data administration mission is once-removed from application systems and thus diluted and weakened.

To explore the friction between data administration and data base management, it is necessary to take a closer look at semantic and symbolic data models.

A data model has three parts: a data structure, operators and integrity rules. A data structure specifies how information is represented as symbols. Widely used data structures include the hierarchy, the network and the table. Operators function as mechanisms for the retrieval and updating of data. Integrity rules are true/false assertions that specify valid data base states.

A symbolic model represents and manipulates symbols, with limited support for their real-world interpretation.

As an example of a symbolic data model, consider the relational model. The data structure of this model involves tables, columns, rows, domains and primary and foreign keys. There are eight basic relational operators. The relational model has two integrity rules — entity and referential. Actually, entity and referential integrity are semantic concepts. Entity integrity expresses the principle that a "thing" must be distinguishable and identifiable. Thus, symbolic models often have some semantic aspects.

IT IS unreasonable to expect the data administrator to adopt the language of the data base manager.

Semantic models

A semantic model incorporates not only symbols but also the meaning of the things the symbols represent. In practice, this means a richer variety of data structures and integrity rules that govern their behavior.

Many semantic data models have been proposed. The favorite of data administration is the entity-relationship model. In fact, there is no standard, well-defined model of this sort. It is actually an amorphous class of models that share a common language. The entity-relationship data structure includes entities, relationships and attributes. Entities represent real-world things, relationships represent connections between things, and attributes represent properties of things.

For example, "employee" and "department" might be entities, "work-in" might be a relationship between the two, and "salary" and "birth date" might be attributes of "employee."

Entity-relationship models usually distinguish subtype from supertype entities. A subtype is a subset of some other entity, called the supertype. For example, "programmer," "sales agent," "manager" and "staff" are subtypes of the supertype "employee."

Entity-relationship models express an

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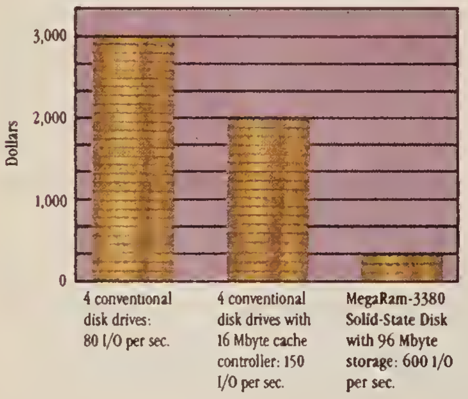

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A RICH VARIETY of semantic data structures and integrity rules exist that can be modeled and supported by a DBMS.

important range of integrity rules. One such rule, exclusivity, applies to subtype entities. For example, one might insist that the subtypes "programmer" and "sales agent" are mutually exclusive — an employee may not be both simultaneously.

Another integrity rule expressed by these models is cardinality. Given a relationship between two entities, A and B, that relationship's cardinality is the maximum number of As associated with each B and conversely. For example, each employee works in at most one department, but each department may have many employees. Thus, cardinality of the "work-in" relationship is "one-to-many."

Unfortunately, operators for entity-relationship models have not been popularized. For this reason, some observers do not consider these to be bona fide data models.

Below the surface

On the surface, semantic and symbolic models are similar. Loosely speaking, the data administrator's entity becomes a table in the data base management system, a relationship becomes a foreign key and an attribute becomes a column.

However, important differences exist between the two models. Consider, for example, the issue of cardinality. Although relationships generally become foreign keys, a many-to-many relationship requires a separate table. Multivalued attributes, such as the names of children of an employee, also require special handling.

Because symbolic models do not support subtypes and associated integrity rules, these must be implemented at great cost in application software — or not at all.

This kind of discrepancy is the Achilles' heel of data administration. The work of the data administrator is not directly implemented and is, therefore, peripheral to the nuts and bolts of data processing. The problem will persist as long as the data administrator and data base manager use different models.

It is unreasonable to expect the data administrator to adopt the language of the data base manager. After all, the semantic model is, by definition, more expressive than the symbolic one. More likely, the language of the data base manager, that of the DBMS, will migrate to the semantic level. In fact, this is currently happening in the commercial marketplace.

One step for semantics

Unisys Corp. recently announced the Semantic Information Manager (SIM), a DBMS based on a semantic model. SIM supports entities (called classes), subtype entities (called subclasses), relationships (called entity-valued attributes) and attributes. A rich data-type mechanism includes support for user-defined and composite data types.

SIM provides an elegant set of operators that take advantage of these advanced data structures. Consider, for example, the query, "print the names of all managers and the title of the department in which they work."

In SIM query language, this becomes:

```
RETRIEVE  NAME OF MANAGER
   DEPT-TITLE OF WORK-IN
```

The simplicity of this query results from SIM's support for relationships ("work-in"), subtypes ("manager," a subtype of "employee") and composite, user-defined data types (attribute "name of employee"). A similar (but not equivalent) SQL query for DB2 might read:

```
SELECT  FIRST-NAME, MIDDLE-
   INITIAL, LAST-NAME,
   DEPT-TITLE
FROM  EMPLOYER, DEPARTMENT
WHERE  EMPLOYEE.DEPT-NO =
   DEPARTMENT.DEPT-NO AND
   EMPLOYEE.STATUS =
   "MANAGER"
```

Finally, SIM provides a sophisticated set of integrity rules. Cardinality of relationships and attributes is declared to the system and is enforced. Integrity rules associated with subtype entities, such as exclusivity, are also supported.

Building from the present

In a sense, there is no such thing as a semantic model. Rather, there are models that are more semantic or less semantic. A rich variety of semantic data structures and integrity rules exist that can be modeled and supported by a DBMS.

For this reason, it is likely that future semantic DBMSs will be extensions of existing DBMSs. In fact, SIM is built on top of DMSII, the Unisys DBMS based on the Conference of Data Systems Languages, or Codasyl, network model. RM/T, a data model published by E. F. Codd in the late 1970s, is based on a relational foundation.

The significance of SIM lies in its advanced support for semantics, as compared with other commercially available mainframe and minicomputer DBMSs. SIM is the first major product to speak the language of the data administrator and enforce related integrity rules.

What this allows is direct implementation of the corporate data model in the DBMS, removing a major impediment to the success of data administration. ●

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Users cast

CONTINUED FROM PAGE 6

and generate any number of reports from that," he says. For example, Challgren may need a report that tells him how a test crop grown from one kind of seed is doing in each location.

Build your own

While some people like Challgren use their data bases straight off the shelf, other nonexpert users say the best feature of their packages is menu-driven programming, which enables them to customize their data bases.

Orlando Lutheran's Bailey, who good-naturedly calls himself "user stupid," says he was able to write his own sales management application within his data base package, Powerbase, just by using the menus.

"I went to the report section without ever cracking that section of the manual," he says.

Bailey's self-customized software enables him to track data on prospects in many different but related files.

For example, he keeps one file, called "master," that contains basic information on a client, such as name, age and address.

For more detail, he can key into the "detail" file and find out more about the case, such as who made the initial inquiry or the prospect's marital status.

Before choosing Powerbase, Bailey looked at Dbase III Plus but says he found the manual hard to understand and the programming commands mind-boggling.

Jeff Tarter, another data base user who is also a professional observer of software trends, says more users will take advantage of menu-driven programming features in the future.

"I think you'll see fewer managers sending off for a programmer to come in and create a program. Now they can do it on their own," says Tarter, editor of "Softletter," a Cambridge, Mass.-based newsletter for the software industry.

Tarter says he bases this observation on personal experience. He developed an application for managing his newsletter circulation off the menus of Alpha/Three from Alpha Software Corp. "And," he notes, "I'm no fancy programmer." •

Ask the vendor

CONTINUED FROM PAGE 8

requirements because it combines the familiar analytic orientation of multidimensional spreadsheets with relational data base management.

What are Seed Software's plans regarding the implementation of its data base in a workstation environment: Does the company plan to set up a distributed system?

John Adams
Vice-President of operations
Chemshare Corp.
Houston

SEED SOFTWARE CORP.: We are currently porting Seed DBMS into the Unix environment. This version is scheduled for release this summer.

We also recognize that Unix is the dominant operating system in the workstation environment and consider this port to be an important step for workstation market penetration. In addition, we are negotiating with major workstation hardware suppliers to implement Seed DBMS in this environment. The next step will be to implement a distributed Seed DBMS.

Software AG has announced many new features for the next release of its Adabas DBMS.

One of these features is support for full distributed data bases. According to announcement literature, the plans are to support a single logical file that is physically stored in multiple separate data bases residing on multiple CPUs.

In such a distribution, how will a search initiated on one CPU, using a descriptor for the file, find records residing in one of the data bases in a different site or CPU?

Randy Ebeling
Software systems specialist
The University of Texas
at Austin
Austin, Texas

SOFTWARE AG OF NORTH AMERICA, INC.: The situation described is called horizontal partitioning or concatenated files. It involves storing one logical file on several separate physical files, which in turn may be on separate physical data bases.

Records are distributed by a distribution key. For example, using department number as the distribution key, warehouse records are kept on the warehouse data base, while factory records are kept on the factory data base. In this case, each data base contains the same file structures; only the values are different.

Adanet, the distributed data base option of Adabas, receives the user's single logical request and translates this into what may be multiple physical requests.

Because Adanet knows the distribution key, it can also optimize the request. These physical requests are created by duplicating the request with different target addresses, which are then sent throughout the network to their appropriate nodes. The local data bases on each node will process each request and return the information to the originating node, providing security is met. All the component pieces are reassembled by Adanet and presented to the user as though it were a single request. •

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But you may NOT send us everything that comes into your head. Our offices aren't big enough to handle all that paper! Please take the time to narrow down your ideas to the two best you can come up with (test them on your friends).

All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligible for a prize. If you are the only one submitting a particular slogan that wins, you, of course, get the prize. However, if more than one person had the same intelligent idea, we'll pick the prize winner out of a hat. Prize winners will receive a $100 certificate good towards the purchase of software from a friendly neighborhood computer store.

All decisions of the judges will be final, and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of *Computerworld*. Deadline for entries is **March 18, 1988**.

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NEW PRODUCTS

Local-area network hardware

A device designed to connect two Ethernet/IEEE 802.3 nodes without using transceivers or Ethernet coaxial cable has been announced by **American Network Connections, Inc.**

Called the **ANC-10 Ethernet AUI-to-AUI** direct connection device, the product provides a 10M bit/sec. transmission path up to 330 ft. According to the vendor, it is transparent to Ethernet nodes. It supports station transmission monitoring and operation diagnosis and has a collision test function switch.

The ANC-10 Ethernet AUI-to-AUI device costs $180.

American Network Connections, 462 Oakmead Pkwy., Sunnyvale, Calif. 94086. 408-737-1511.

An add-on card that provides a four-user network for IBM Personal Computer ATs has been introduced by **Intercontinental Microsystems.**

Called the **Quicklink-IV**, the card is compatible with Intel Corp. 80286- and 80386-based file servers, adding four independent, diskless workstations to the file server's bus. User interface is via RS-232 or RS-422 to the dumb terminal or modem.

The card incorporates four NEC Corp. V40 8-MHz processors. Each processor has 768K bytes of zero-wait-state user memory.

The Quicklink-IV is priced at $2,295.

Intercontinental Microsystems, 4020 Leaverton Court, Anaheim, Calif. 92807. 714-630-0964.

Local-area network software

A communications software program for IBM Personal Computers and compatibles has been announced by **Datastorm Technologies, Inc.**

Features of the **Procomm Plus** software include 12 error correcting file transfer protocols, including Xmodem, Ymodem and Kermit; 16 asynchronous terminal emulations, including Digital Equipment Corp.'s VT102, IBM 3101 and IBM 3270; an automated dialing directory; and a script-command language.

Procomm Plus is priced at $75.

Datastorm, Suite G, 1621 Towne Drive, Columbia, Mo. 65202. 314-474-8461.

Personal computer-based contentional ring network software that supports up to 10 computers per network cluster has been announced by **Applied Knowledge Groups, Inc.**

Called **Open-Net**, the software includes a full IBM Netbios module, record and file-locking options, a programmers' interface, simultaneous access to multiple shared printers and support for disks with nonstandard sector sizes to 4K bytes.

Open-Net is priced at $299 per computer.

Applied Knowledge Groups, Suite 102-B, 33 Music Square W., Nashville, Tenn. 37203. 615-244-2828.

Customer-premise equipment

A product designed to store, retrieve, sort and dial voice or data calls from its 2,000-name directory has been announced by **Paracom.**

The **PCphone** uses a 1,200 bit/sec. modem, an existing private branch exchange, a key system and central switches. Features include speaker phone, electronic mail, a perpetual calendar, a calculator, data terminal emulation, serial and parallel ports and security. It supports up to 30 telephone lines.

Prices range from $1,895 to $2,195.

A board-level product called Paralink allows PCphones to share a 200,000-name directory, master scheduler and applications programs in an IBM Personal Computer environment at 9.6K bit/sec. It is priced from $1,295.

Paracom, 310 Paseo Tesoro, Walnut Creek, Calif. 91789. 714-594-3193.

Links

Two products designed to allow personal computer users access to Transmission Control Protocol/Internet Protocol (TCP/IP) environments have been announced by **The Wollongong Group, Inc.**

Win/PC 3.2 supports communications between IBM Personal Computers and compatibles running in either IBM's PC-DOS or OS/2 environments and host systems via local- or wide-area networks running TCP/IP.

With Win/PC 3.2, users can transfer files, send mail or become a user on another host with normal logon procedures, according to the vendor. In addition, support is provided for IBM's Netbios software interface.

Win/PC Route 1.0 provides a gateway for Netbios-based PC LAN users to communicate with Ethernet network environments using TCP/IP. It supports up to three physical interfaces including Ethernet and Novell, Inc.'s Netware software interface.

Win/PC 3.2 costs $395. Win/PC Route 1.0 costs $149.

The Wollongong Group, 1129 San Antonio Road, Palo Alto, Calif. 94303. 415-962-7200.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Can't live by CPU alone

Number crunching has never been easier. Supercomputers, near-supercomputers, minisupercomputers and personal supercomputers (ugh — flog the fool that came up with that term) are being announced almost weekly with performance ratings that soar past those of existing processors.

Innovative technologies are producing CPUs that can handle complex scientific, engineering and financial applications as fast as their pipelines can feed them the raw numbers. But a red flag flies when one looks at whether these computers can get their numbers fast enough.

During a recent conversation, John E. Ranelletti, computing department head at Lawrence Livermore National Laboratory in Livermore, Calif., made it clear that CPU technology is leaving related technologies — storage, communications and software — in the dust. The result is that users, even at some of the most sophisticated supercomputer sites — such as Ranelletti's own — cannot take advantage of hot processors because the CPUs

Continued on page 60

A tale of two 8100 migrations

One user chooses distributed Microvaxes, one switches to PC networks

BY STANLEY GIBSON
CW STAFF

Like a people forced to leave their homeland, IBM 8100 users have been wandering for the past two years in search of new computing territory.

Their quest began when IBM announced two years ago that the 8100 system would not be enhanced further, reportedly calling the system "functionally stabilized." Seeking a new beginning, those users have reevaluated their computing requirements, considered different vendors and taken a close look at new technology.

"The people who made the decision on the 8100 felt disappointed. They believed they would have a migration path. They were let down," says Matt Hogan, director of the California Assembly's Office of Information Services, expressing the emotional reaction of many users.

Once the initial shock had subsided and the search for a new computing platform had begun, Hogan set a primary target to be a system that would offer architectural continuity for many years to come. Hogan opted for distributed Digital Equipment Corp. Microvaxes linked by Decnet.

In contrast, Joseph Brophy, senior vice-president of The Travelers Corp. in Hartford, Conn., was less startled by the demise of the 8100 and expresses none of the same bitterness. His replacement solution is a series of distributed IBM Token-Ring networks linking IBM Personal Computers.

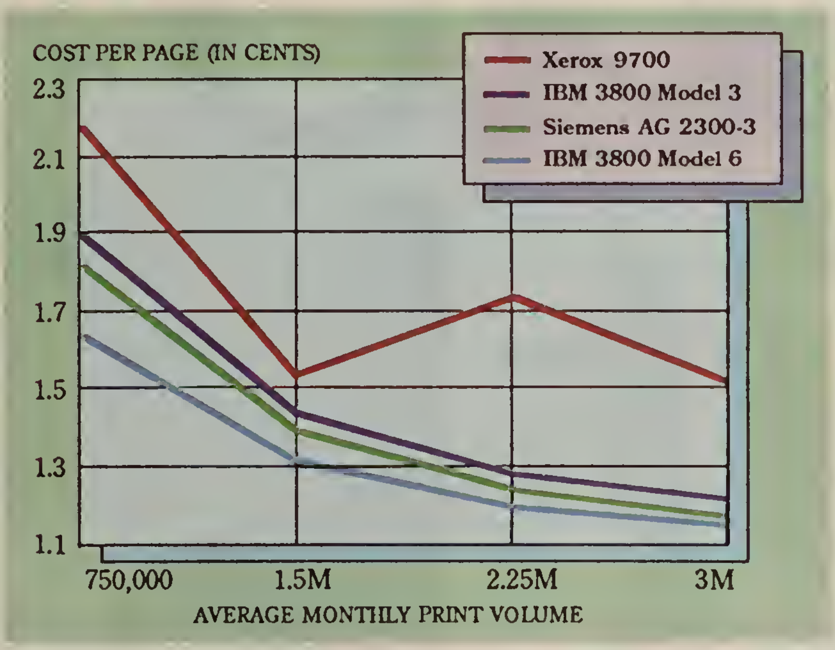
"Looking back on the 8100, it was a good investment," Brophy says. "It made a lot of sense. It had high availability, high performance and good response time.

Continued on page 64

Data View

Volume savings

Per-page costs plummet as large printers handle heavy work loads



INFORMATION PROVIDED BY CAP INTERNATIONAL, INC.
CW CHART

Xenix for the high end

BY STANLEY GIBSON
CW STAFF

IRVINE, Calif. — Bringing the Xenix operating system to as many as 64 users, Corollary, Inc. recently announced the Corollary 386/MP multiprocessor system, which can be expanded from one to five Intel Corp. 80386-based processors.

The product is a successor to Corollary's Intel 80286-based multiuser system.

Each board can contain an Intel 80387 coprocessor and 1M or 4M bytes of memory, according to the vendor. The processor boards are added to Corollary's

Continued on page 60

Sequoia bolsters Series 200

BY STANLEY GIBSON
CW STAFF

MARLBORO, Mass. — Sequoia Systems, Inc. recently boosted connectivity and storage options for its Series 200 family of fault-tolerant systems by announcing an 850M-byte Winchester disk drive, Ethernet support and SNA communications software.

In addition, Sequoia announced support for Transmission Control Protocol/Internet Protocol (TCP/IP).

Introduced last October, Sequoia's Series 200 runs AT&T's Unix System V operating system as well as Pick Systems' Pick operating system and is intended for on-line transaction processing applications.

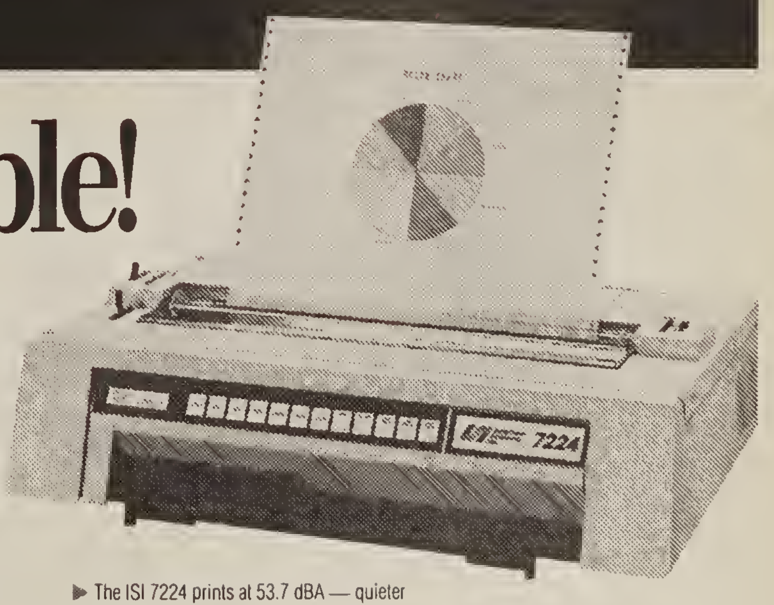
The Ethernet controller is priced at $10,000, and the TCP/IP software license is priced at $6,000. Both are scheduled to ship in June.

Sequoia's IBM 3270 Systems Network Architecture (SNA) product allows a Series 200 to communicate with an IBM host

Continued on page 65

Inside

- Data digital audio tape backers bucking for standards. Page 65.
- HP aims terminal at multiuser PC environments. Page 68.



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In Cartright’s view, Inland Steel’s continued success depends largely on the innovative management of information. “As competition heats up, both domestic and off-shore, we have to run smarter. Digital gives us the tools to do just that.”

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Connolly

CONTINUED FROM PAGE 57

are hamstrung by support technologies that lag far behind.

Ranelletti makes the point that it is easy to get caught up in the excitement of CPU technology. He is not looking for disk drives that hold twice as much data or networks with even three times the throughput. He and his peers throughout the supercomputer user community need improvements measured in orders of magnitude.

"There's an old saying in supercomputing that supercomputers turn big CPU problems into big I/O problems," he notes.

> "THERE'S AN OLD saying in supercomputing that supercomputers turn big CPU problems into big I/O problems."
>
> JOHN E. RANELLETTI
> LAWRENCE LIVERMORE NATIONAL LABORATORY

Ranelletti, whose one department at the sprawling laboratory runs six Cray supercomputers and myriad smaller systems, looks at what could be done with today's CPU technology if it were paired with comparable disk, communications and software improvements in balanced systems. He sees the potential for getting 100 times the performance.

But don't expect those gains to be around the corner. It seems that comparatively little attention is being paid to the support technologies by vendors. Ranelletti concedes that individual vendors do reach a point at which they decline to invest in supercomputing because the market is relatively small and the development costs high.

Therefore, he suggests a national supercomputing effort, perhaps a consortium like Microelectronics & Computer Technology Corp., that can lead to the development of balanced supercomputer systems.

Much yet to do

Ranelletti says work is needed at most points throughout a supercomputer system. He cites a shortage of software written to take advantage of today's high-speed processors. He focuses on the lack of tools to allow automatic parallelization and notes that ever-popular Unix just isn't cut out for supercomputing.

He says that while networks and storage subsystems — whether on-line or archival — may be good, they don't match the performance of the host CPUs. New materials and new architectures are needed to boost throughput.

That is why he suggests a consortium — whether driven by the industry or the federal government — to lead the development effort. Ranelletti cites the importance of keeping the U.S. in the lead in supercomputers but adds that such developments would provide benefits to users at all levels of computing. He points to the trickle-down effect of computer technology as innovations in today's supercomputers migrate to future generations of smaller computers.

"I don't think there is anything that goes on at the supercomputer level that doesn't end up on the tabletop," Ranelletti concludes.

Connolly is *Computerworld's* senior editor, management.

Xenix

CONTINUED FROM PAGE 57

386-based personal computer, plugging into the system's IBM Personal Computer AT-compatible bus.

At the high end

"The Corollary 386/MP system enables Xenix to serve the high-end market that was previously the exclusive domain of the minicomputer," said Corollary President George White in a prepared statement.

The system will be sold by Corollary value-added resellers and OEMs who specialize mainly in small business applications. Many of those resellers have developed packages for Corollary's 286-based system, which, according to Corollary, will be portable to the 80386-based system.

In order for the system to serve multiple users, an eight-port terminal concentrator, the Corollary 8/TC, must be added.

Shipments of the Corollary 386/MP to key accounts will begin in April, with general availability in May, Corollary said. The suggested retail price is $2,795 for the Corollary 386/MP processor with 1M byte of memory.

The 386/MP processor with 4M bytes of memory is priced at $4,195. Boards containing the 80387 coprocessor cost an additional $1,500.

The Corollary 386/MP extended kernel software, which allows multiple processors to be used under Xenix, is priced at $195.

The Corollary 8/TC terminal concentrators are priced at $595 each.

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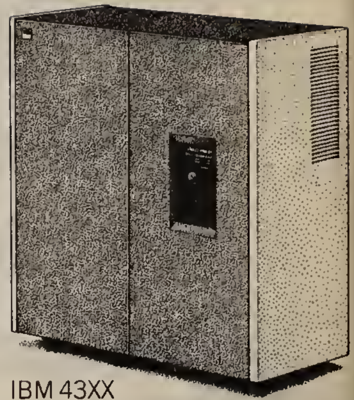
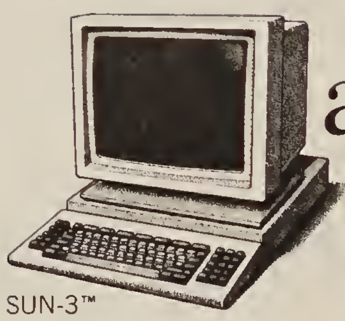


IBM 43XX
PROCESSOR



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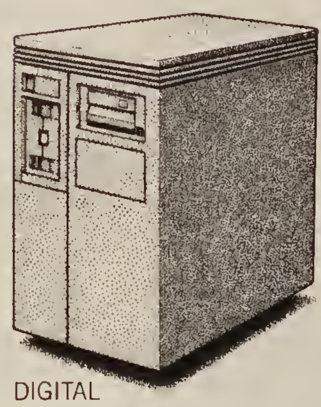

DIGITAL
MICROVAX* II

and

IBM 3194
DISPLAY STATION

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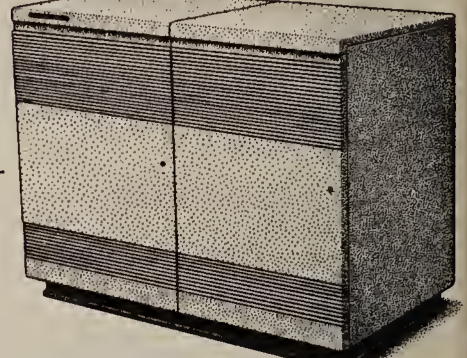
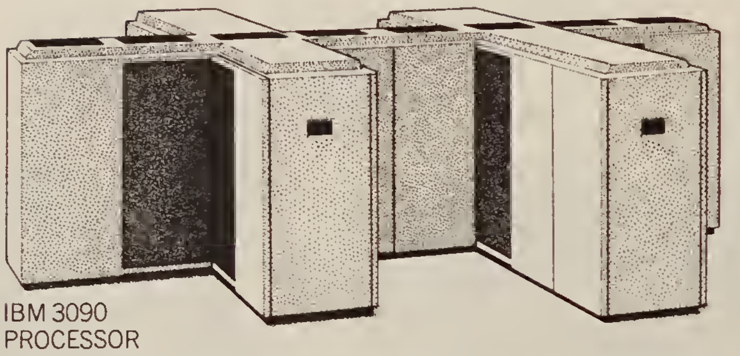


HEWLETT-PACKARD*
COMPUTER



IBM 3090
PROCESSOR

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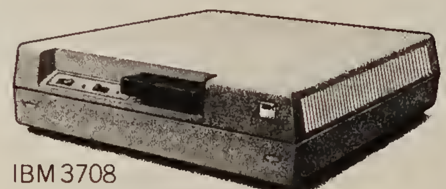

IBM 3708
NETWORK
CONVERSION UNIT

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DIGITAL
ASCII TERMINAL

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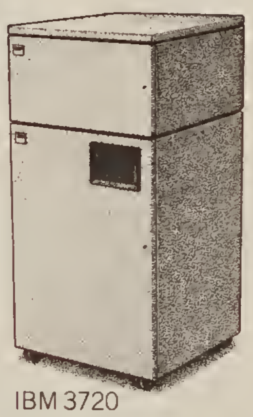
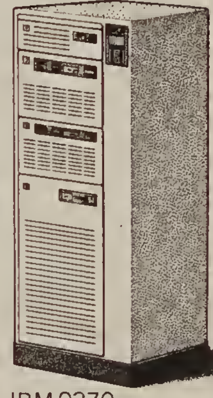


IBM 3720
COMMUNICATION
CONTROLLER

and

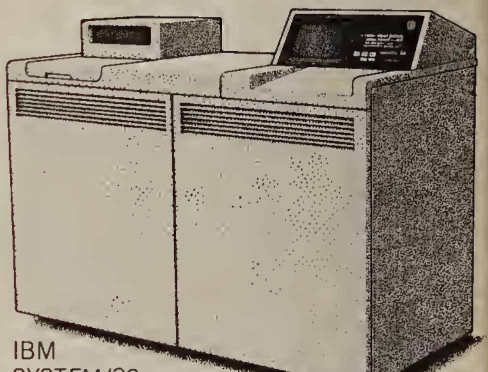
PUBLIC
SWITCHED NETWORK

and

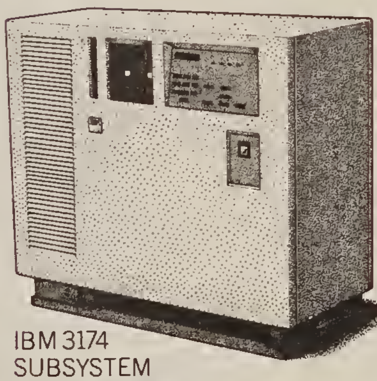


IBM 9370
INFORMATION SYSTEM

and



IBM
SYSTEM/38

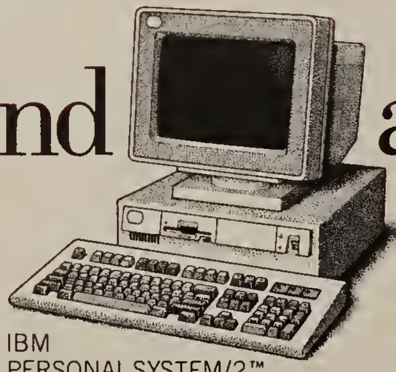


IBM 3174
SUBSYSTEM
CONTROL UNIT

and

IBM 8228
TOKEN-RING NETWORK
MULTISTATION ACCESS UNIT

and



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FAMILY

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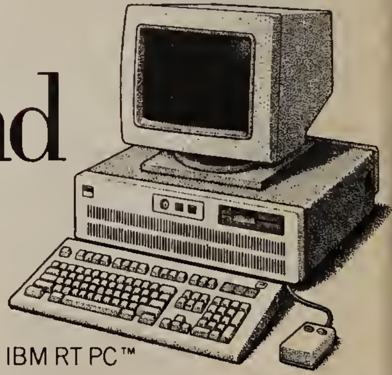

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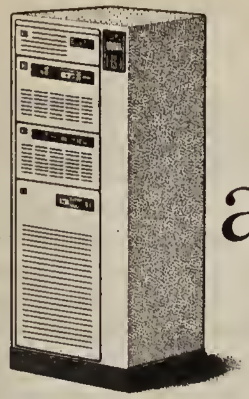

IBM 9370
INFORMATION SYSTEM

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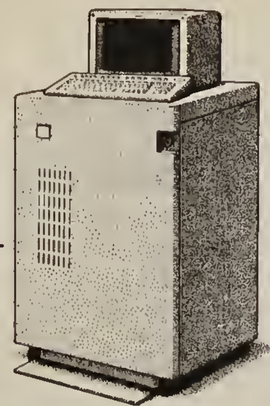
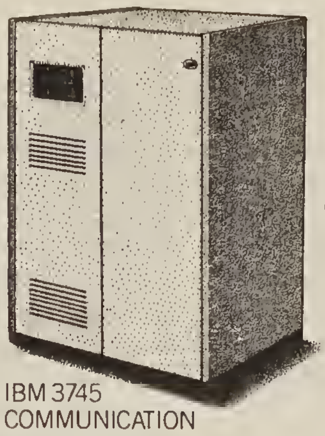


IBM 8232
LAN CHANNEL STATION
(TCP/IP GATEWAY)

and

IBM
PERSONAL COMPUTER
WITH 3270 EMULATION

and



IBM 3745
COMMUNICATION
CONTROLLER

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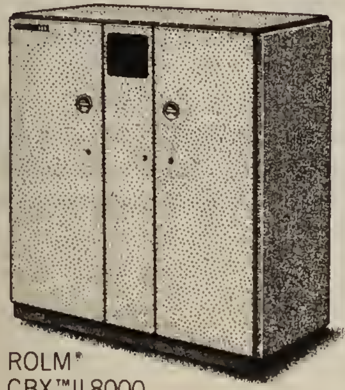

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CBX™II 8000

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ROLMPHONE* 240D

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IBM
PERSONAL COMPUTER
FAMILY

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DIGITAL VAX™

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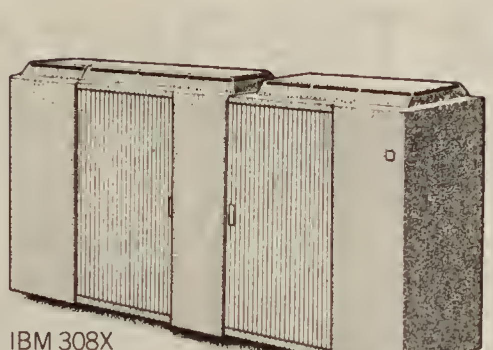
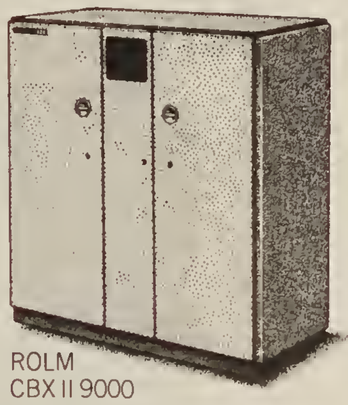


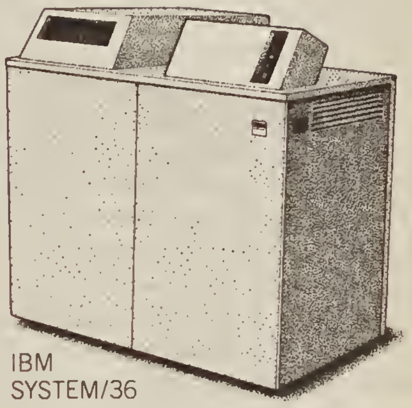
IBM 308X
PROCESSOR

and



ROLM
CBX II 9000

and



IBM
SYSTEM/36

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IBM 4956
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N.E.T. IDNX*
T-1 RESOURCE
MANAGER

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IBM 9751 CBX,
DEVELOPED BY
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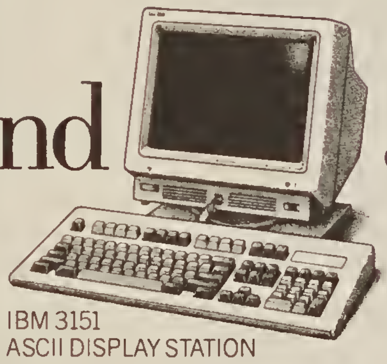

IBM 3151
ASCII DISPLAY STATION

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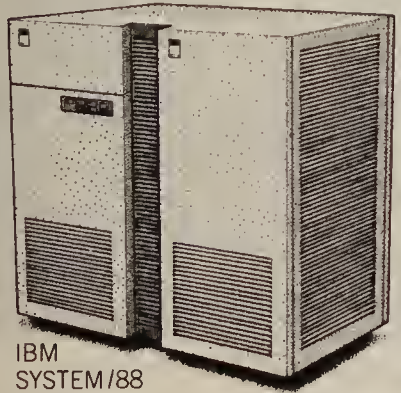

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IBM® The Bigger Picture

Migrations

CONTINUED FROM PAGE 57

But there comes a point with all these machines when maintenance gets too expensive.

"IBM was very visionary in what they were doing. They were beginning to evolve their LAN strategy," Brophy says.

Passing on Token-Ring

Hogan, however, looked at a similar Token-Ring proposal from IBM and passed it over. He says DEC's All-In-1 office automation software and mainframe connectivity through DEC's version of IBM's Systems Network Architecture (SNA) gateway were superior to those offered by IBM's proposed local-area network of its PC ATs connected to an IBM mainframe host through SNA.

Hogan says IBM proposed Displaywrite software on the PC ATs, using Personal Services/PC as a Distributed Office Support System interface with the host. "There were more steps involved communicating with the host than with the DEC solution," he adds.

The state of California's plan is to provide each state senator and representative with two Microvax-based office automation systems: one at the legislator's office in Sacramento and another at his home district office.

The systems in the district offices, each of which supports three or four terminals, were installed a year ago. Each district office is connected over a wide-area network and SNA gateway to an IBM 3081 Model K mainframe running IBM's MVS/XA in Sacramento. The host contains the text of every bill introduced in the legislature, with filing dates and summaries.

All the Microvaxes in the various offices will be identical, containing 13M bytes of memory. The systems and network are to be kept up all the time and will be centrally managed, Hogan says.

Capitol switch

The next stage of implementation calls for the replacement of 34 8100s in capitol offices in Sacramento with some 100 Microvaxes connected over an Ethernet LAN. Looking ahead, Hogan expresses confidence in an upgrade path in which systems requiring more power could be replaced by Microvax 3000 systems.

At The Travelers, a traditionally close relationship between vendor and customer helped soften the blow of the 8100's demise. When the 8100's fate became apparent, Brophy sought to provide the same function by alternate means. The 8100s handled claims processing in offices around the country, communicating with a central host system.

Now, Brophy says, he is convinced that the PC LANs are a superior solution to the distributed 8100s. He says that the move to Token-Rings was inevitable and would have taken place even if the 8100 were still supported.

In-house programmers developed a new system for PCs using screens similar to those used on the 8100-based system, to which more functions were added. Brophy says it took his programmers eight months to develop the application and three months to migrate from the 8100s to the PC networks.

The Travelers is now installing IBM Personal System/2s, replacing existing ATs wherever necessary. Brophy says the ATs were selected because IBM made it clear to him early on that the PS/2, using the Intel Corp. 80286 and 80386 microprocessors, would be related more closely to the PC AT than to other members of IBM's original PC family.

The Travelers is also installing some diskless PS/2 Model 50s [CW, Feb. 1] and may install dumb terminals and servers on the Token-Rings where necessary.

Despite the loyalty of users such as Brophy, the discontinuance of the 8100 has been a wrenching experience for a number of users, according to Brian Blackmarr, president of Blackmarr and Associates, a consulting firm in Dallas.

"In general, 8100 migration was ill-prepared for. Customers did not anticipate and appreciate it, particularly large customers," Blackmarr, a former IBM employee, says.

Blackmarr concludes from a study that most very large accounts do not want to move to a two-tier architecture such as The Travelers'. They view a PC network as difficult to support and limited in function, although it may be inexpensive.

Expertise needed

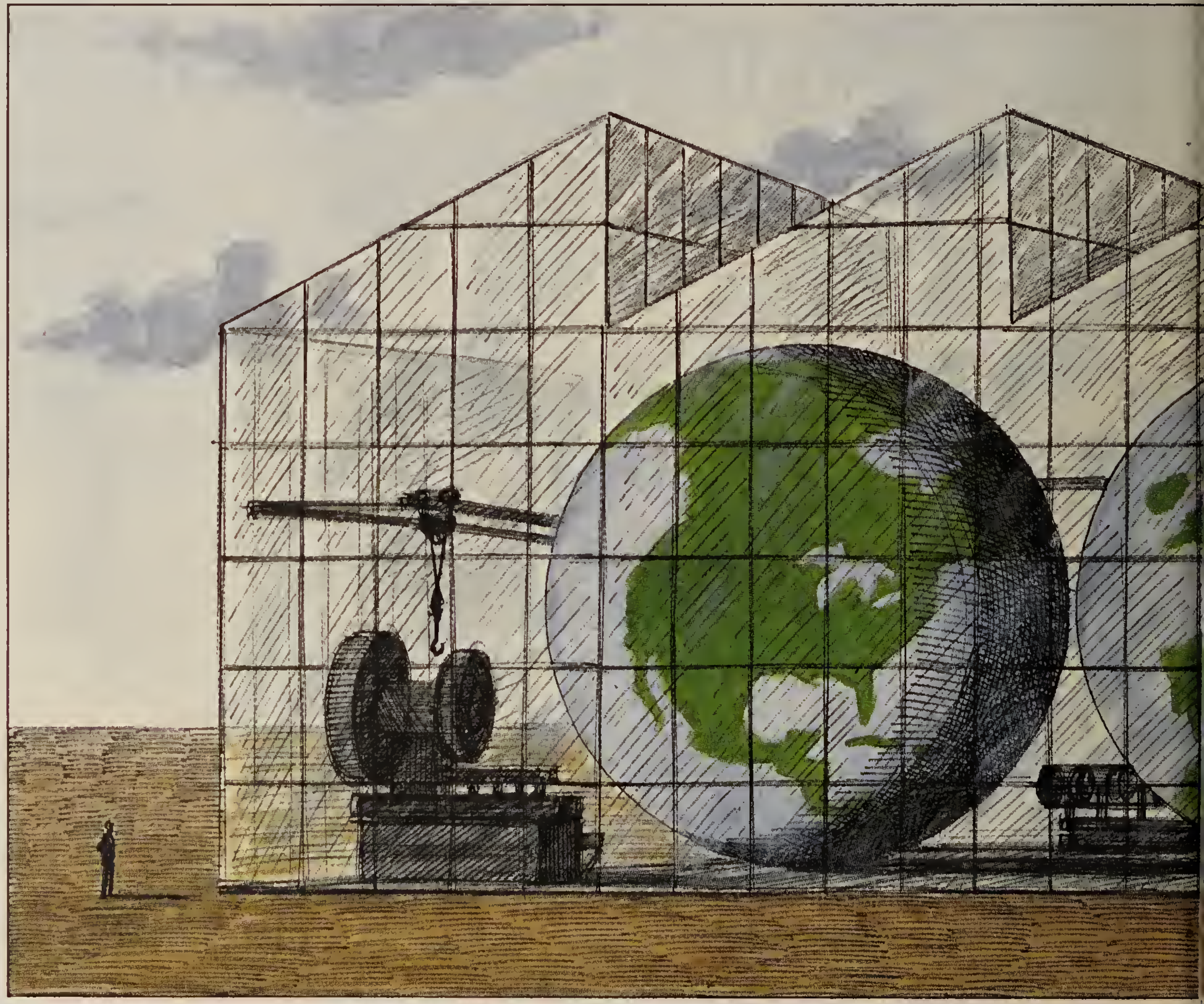
He adds that a Token-Ring PC network requires considerable expertise on the part of users — someone has to know how to operate PS/2s, load diskettes and so on. Blackmarr adds that diskless PS/2s, such as those used by The Travelers, may be a solution to this drawback.

Meanwhile, IBM's 9370 departmental system is viewed as difficult to run and expensive to support, the consultant says, despite the fact that IBM has promised a migration path to the 9370 for 8100 users with the DPPX operating system.

Almost certainly, the most expensive alternative is a remote connection to a host using telephone lines, a generally unacceptable choice, Blackmarr says.

The end of the 8100 will mean the inevitable erosion of a part of IBM's customer base, Blackmarr's study shows. Seventy-five percent of users surveyed by Blackmarr report that they are willing to consider non-IBM equipment, and of that 75%, DEC is emerging in the dominant position, Blackmarr says. The remaining 25% who are committed to an IBM solution are up in the air, often puzzled by choices, according to Blackmarr.

Nixdorf CIM. The Best of Both Worlds



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HARD BITS

Data audio tape gathers steam

The technology is far from being a dominant force in the storage area, but **data digital audio tape** (Data/DAT) already has its backers for standardization.

According to consultant Lee H. Elizer, president of Peripheral Strategies, Inc. in Santa Barbara, Calif., 24 companies recently sent representatives to a conference on standardization of helical-scan Data/DAT drives, media and components.

The group established planning targets for purposes of alternate OEM sourcing and data interchange format definitions, Elizer said.

C. Itoh Electronics, Inc. and **Acom Computer, Inc.** recently signed an agreement under which they will market C. Itoh's ion deposition printers into IBM System/34, 36 and 38 twinaxial environments. Under the two-year pact, Acom will become the principal distributor and will provide maintenance for C. Itoh's 30 and 45 page/min nonimpact printers.

Acom also provides proprietary protocol converters that enable a page printer to emulate IBM 5219 and 3812 printers.

C. Itoh's Megaline series features line printer emulation, which, at 30 and 45 page/min, are comparable to 2,000 and 3,000 line/min printers, according to C. Itoh. That company also claims its Megapro series of 30 page/min printers provides more sophisticated output.

In a recent series of signings, **Data General Corp.** inked six value-added reseller pacts. The contracts were with real estate automation systems VAR First Data Systems in Nashville; manufacturing software vendor Orbi, Inc. in The Netherlands; investment services systems provider Financial Information Network, Inc. in Van Nuys, Calif.; patient billing and administrative systems supplier Health Care Network in Louisville, Ky.; life insurance applications developer Fipsco, Inc. in Park Ridge, Ill.; and computer-aided software engineering systems vendor Exsys, Inc. in New York.

McDonnell Douglas Manufacturing and Engineering Systems Co. in St. Louis recently got into the Unix market with an agreement to resell **Hewlett-Packard Co.** HP 9000 workstations and minicomputers in combination with McDonnell Douglas's Unigraphics mechanical design and engineering software.

The U.S. Naval Research Laboratory in Washington, D.C., is expanding its 64-node **BBN Advanced Computers, Inc.** Butterfly system with an additional 64 nodes based on BBN's Butterfly Plus processors. The system is used to simulate expert systems for Navy battle management and network optimization.

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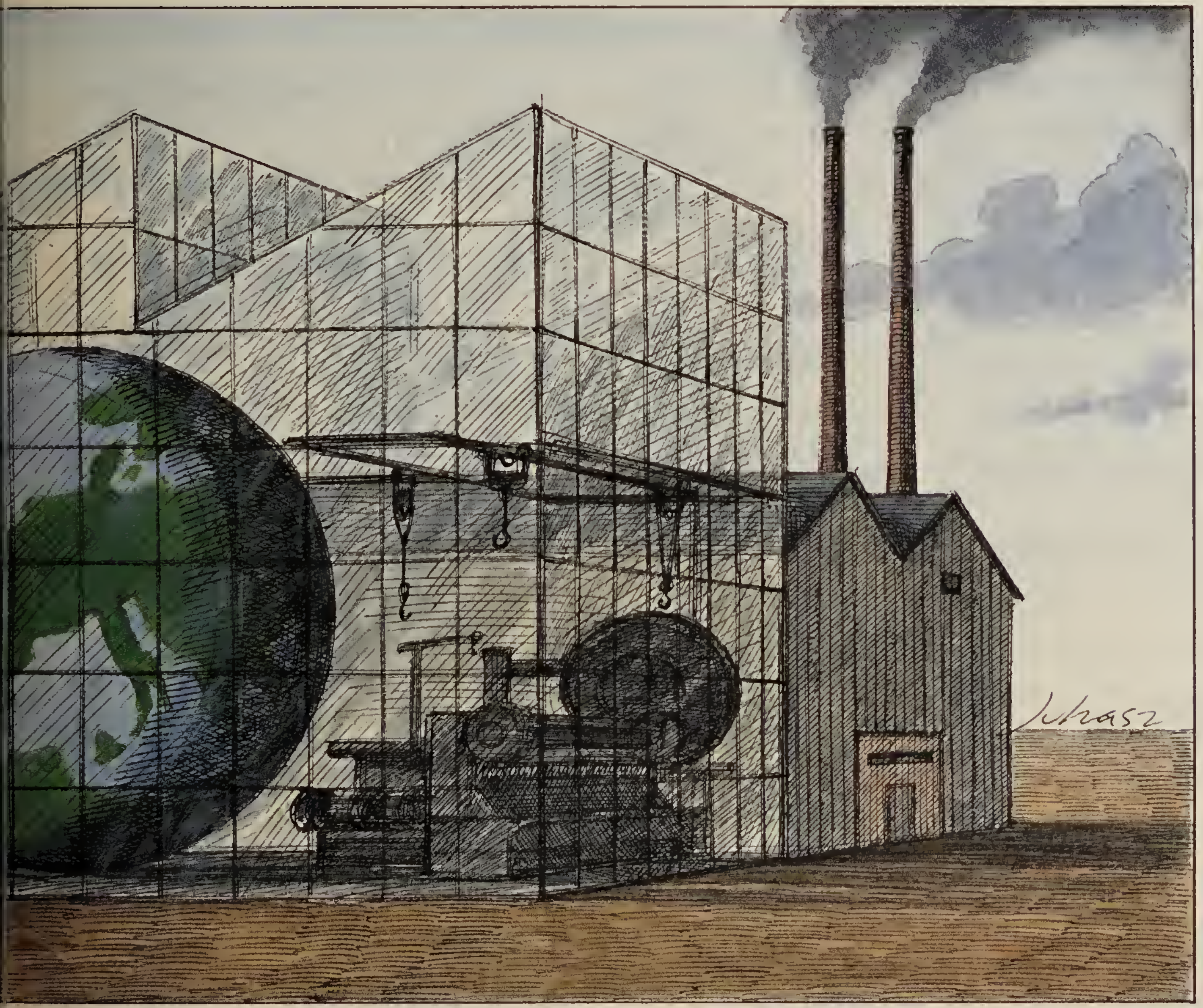

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Sequoia

CONTINUED FROM PAGE 57

over dedicated or switched lines. The system appears to the host as an IBM controller with attached 3270-type displays and 3287 printers and may access applications running on the IBM system. The software license is priced at $7,500.

A 3270 Applications Program Interface lets programs running on a Series 200 communicate directly with application programs on an IBM host. This provides distributed processing without the modification of host-based systems and applications, the vendor said. The license is priced at $5,000.

In addition, a 3287 Printer Emulation product provides SNA LU3 support for standard ASCII printers attached to a Sequoia system. It is priced at $3,500. All three SNA products are scheduled for April shipment to customers.

The new disk is an 850M-byte Winchester drive in packaging identical to that of Sequoia's current 8-in. diameter 368M- and 500M-byte drives. Using the drive, a customer can put more than 13G bytes in a single Sequoia peripheral cabinet, Sequoia said. The 850M-byte drive, manufactured by Control Data Corp., is scheduled to be delivered in April and is priced at $25,500.

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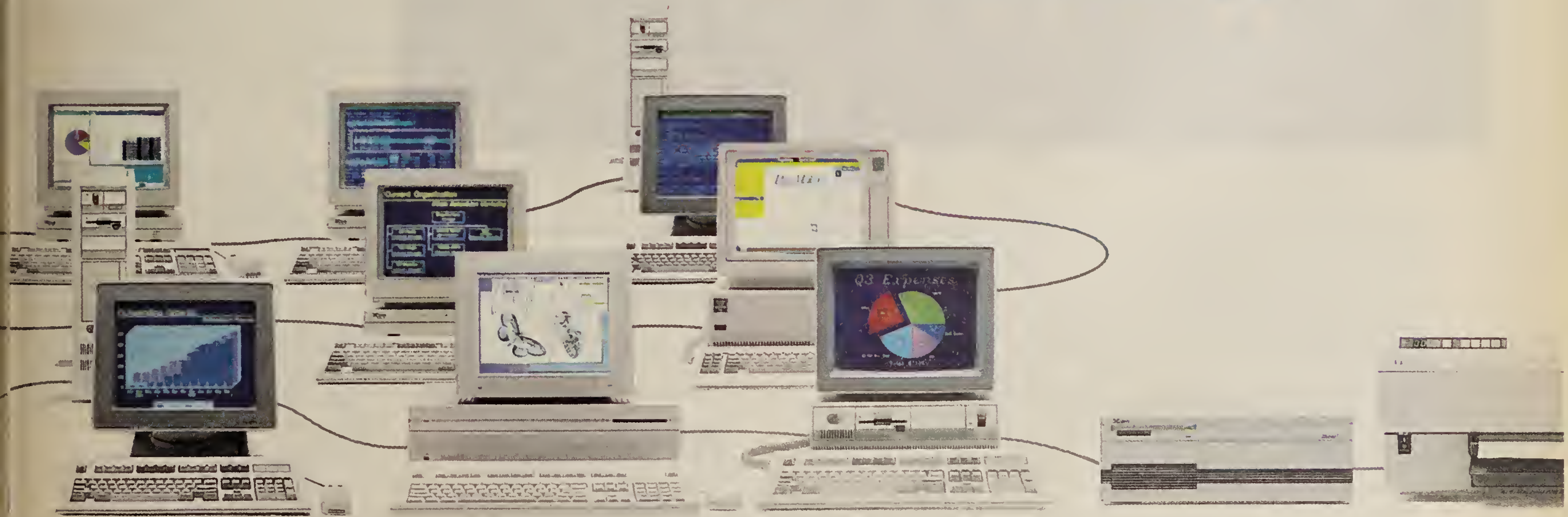

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NEW PRODUCTS

Processors

Applied Digital Data Systems, Inc., a subsidiary of NCR Corp., has introduced an enhanced model of its **Mentor 6000** multiuser system.

The Model 6A can be configured with 2M to 8M bytes of error correction control random-access memory, 16 to 128 serial ports and two to four parallel printer ports. The peripheral subsystem comes with 487M to 1,384M bytes of unformatted disk capacity, one or two ½-in. 1.6M/3.2K bit/in. tape drives and a ¼-in. streaming cartridge tape drive.

Also included is the Mentor operating system, an implementation of Pick Systems, Inc.'s Pick operating system.

Prices for the Mentor 6000 Model 6A start at $80,000.

Applied Digital Data Systems, 100 Marcus Blvd., Hauppauge, N.Y. 11788. 516-231-5400.

A single-board Motorola, Inc. VME-based computer has been introduced by **Heurikon Corp.**

Called the **HK32/V532**, the processor is based on the National Semiconductor Corp. NS32532 32-bit microprocessor. It supports Unix and real-time applications. Features include an integrated on-chip paged memory management unit, 512-byte instruction cache, 1,024-byte data cache, 4M or 16M bytes of on-board dual-access dynamic random-access memory with parity and 128 bytes of nonvolatile RAM.

Prices range from $6,000 to $7,000.

Heurikon also introduced the **HK68/M12E** 32-bit Multibus I microcomputer and the **HK68/M130** 32-bit single-board microcomputer for Unix and real-time applications. The former is based on the Motorola 68020; the latter is based on the Motorola 68030. They cost from $2,395 and $4,995, respectively.

Heurikon, 3201 Latham Drive, Madison, Wis. 53713. 608-271-8700.

Data storage

A multifunction Digital Equipment Corp. Q-bus- and Unibus-compatible subsystem for data storage has been announced by **Summus Computer Systems.**

The **Gigabox-MF** comes in either a 5¼-in. rack-mount or a pedestal enclosure. It features more than 1G byte of hard-disk storage integrated with a 2.33G-byte unattended back-up tape drive. The hard disks offer a 16-msec average access time and a 25,000-hour mean time between failure rate.

The 8mm tape drive is said to be software-transparent. According to the vendor, the drive is compatible with DEC's VMS, Ultrix, RSTS, RT-11 and RSX as well as AT&T's Unix System V.

The Gigabox-MF subsystem is priced from $19,995.

Summus Computer Systems, P.O. Box 820549, Houston, Texas 77282. 713-589-9772.

Terminals

An IBM 3270 replacement display for use in interactive communication system networks has been introduced by **Harris Corp.'s** Data Communications Division.

The **H192-D** display features Coax Multidrop and built-in RJ11 twisted-pair support. Coax Multidrop permits up to eight displays to be attached to a single controller multiplexer port.

The Harris *H192-D*

Other features include a row and column indicator, a vertical scroll capability and support for four screen sizes.

The H192-D is priced from $1,595.

Harris, 16001 Dallas Pkwy., Dallas, Texas 75248. 214-386-2000.

Hewlett-Packard Co. has introduced the **HP 700/44** terminal for multiuser personal computer-based environments and the general-purpose **HP 700/43** ASCII terminal.

When the HP 700/44 is connected to a PC running The Santa Cruz Operation, Inc.'s Xenix operating system, it can use the same PC application programs. Features include the IBM Personal Computer character set, an enhanced PC keyboard layout and a 14-in. display screen with 80- and 132-col. modes.

The HP 700/43 is an enhanced version of the HP 700/41. It offers four pages of memory, 80- and 132-col. modes, 58 programmable keys and 12 emulation modes.

Both displays come with amber, green or soft-white phosphor. The HP 700/44 costs $575; the HP 700/43 costs $475.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

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Work group computing supports people, not applications

An interview with Patricia Seybold

Can information systems ever provide more than passive support for a group working together? Will we see the day when workstations redefine the way a project team collaborates?

According to Patricia Seybold, president and chief executive officer of The Office Computing Group, Inc., a Boston-based publishing and consulting firm, work group computing is just starting to make its way to real applications.

Seybold spoke recently with *Computerworld* associate editor Kelly Shea about work group computing and how it may change the way people work.

What is — and isn't — work group computing?
It's a computing environment that fosters cooperation. Some people get confused with the term "work group computing." They tend to make it synonymous with departmental computing, or they tend to equate it with a kind of system architecture, such as a PC LAN.

In fact, its prerequisites are that people are linked electronically, that they are typically working on either the same task or different aspects of related projects and that the software might very well be proactive in its support of them.

So, for example, a new project management application designed for work group computing would notice when somebody completes something or is working on something, and it would alert people. It would also notice when something isn't being done and alert other people.

This proactive part means agents in the system will automatically take preprogrammed actions, based on certain conditions. That's a quality that's not always there yet in so-called "groupware." The term that I use to describe that proactive capability is "procedural automation." An example of that is Hewlett-Packard's New Wave product (see chart next page).

So a work group could be a department of people or a small office of people, but it could also be separate, remote individuals?
Right. Or it could be someone from marketing, somebody from engineering and somebody from finance working on a project team. Work group computing is not necessarily departmental computing. We're really going beyond that. We're adding another layer of intelligence to the application.

ALAN WITSCHONKE

What are the unique hardware, software and communications needs of a work group?
In terms of special hardware requirements, I'm not sure there are any. From a software standpoint, I think multitasking is a nice prerequisite. It's very difficult to do some of this work if you don't have a multiuser, multitasking environment.

Another important aspect concerns the relative sophistication of the file management system. With many of these applications, you're moving into a requirement for distributed data base. And that which can be distributed doesn't fit our conventional picture of a data base. It's not just data. It might be huge amounts of text; it might be text with graphics.

The kind of hardware and software platform that will allow this type of software to really flourish, particularly with people who are physically proximate, is probably best exemplified by Apollo's Networked Computing System standard. This standard offers a distributed networked environment that allows people and information to hook together interactively in a seamless, transparent way.

That brand of networking is going to start migrating from the Unix, scientific and technical worlds into the commercial marketplace. The DOS, OS/2 and Macintosh environments will begin to take on some of those characteristics.

So there is a flavor of networking that is particularly good for this sort of application, but it isn't really required. The main attributes are that you have the ability to see what other people are working on and to see how their suggestions might affect what you're working on. You can do that in whatever mode you want to.

> "AS WE'VE automated offices, one of the things we find is that it's not really any easier for groups of people — as groups — to get work done."

Are there any particular products actually being used in this kind of environment?
One is a form of electronic mail software, Coordinator from Action Technologies, which goes one step beyond electronic mail. It forces you to be very explicit about making promises, requests and commitments. And then it helps you track promises you've made and ones other people have made to you. What it doesn't yet do is actually go and tap people on the shoulder.

A good example of an application environment that supports work group computing comes from Motorola. It's a family of products called Life, which stands for Linked Information

……

- **It's not just shared data**
- **For groups that are 'hot and clicking'**
- **A polite way to interface**

For times when two heads are better than one

Do you spend a lot of time in meetings? If so, you may have wondered why, with so much technology out there to help people do their individual jobs, isn't there an automated way to conduct group meetings?

The answer is, you're imagining an implementation of work group computing that is not yet out of the laboratory.

But it's coming. Xerox Corp.'s Palo Alto Research Center (PARC) in California is pursuing the idea. PARC's Intelligent Systems Laboratory created an environment for work group computing called Colab. Begun in 1984 as an offshoot of PARC researcher Gregg Foster's doctoral dissertation, Colab consists of a small meeting room, four desks — each with a Xerox LISP workstation — and a large projection screen. Small groups can conduct meetings using high-technology tools that store and track everyone's ideas.

The project is currently in the prototype stages. Its primary users are the six-member Colab research team, headed by Foster and Mark Stefik.

Colab workstations are connected over an Ethernet network, and its software is built on top of Xerox Interlisp, a LISP dialect. Several software modules have been developed to support the various aspects of group computing.

The module used most successfully so far is Cognoter, an idea processing tool used to prepare presentations. It imitates the process of collaborative writing. Through the Cognoter multiuser software, the group starts with a clean slate.

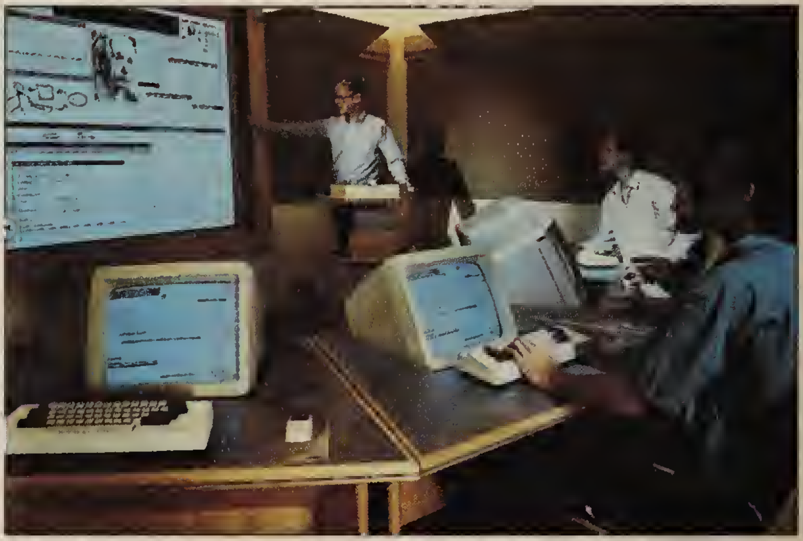
They brainstorm, then organize, then evaluate ideas — all on the shared space of the computing environment. Everyone works individually, but each person's ideas can be made available to other members of the group via windows on their own screens as well as on the large projection screen in front, if that is desired.

Talking among the group is by no means eliminated. As Foster describes a typical Colab work group, "We alternate between focusing on our own screens or working in parallel, which is one of the big productivity gains of the system."

At this point, Colab is not officially being considered a product offering by Xerox. But, says Foster, "My work has improved using these tools."

"The problems we all work on these days are so complicated that they're very hard to deal with as an individual," he says. "I'm convinced that small work groups is the way to get good work done."

KELLY SHEA



Xerox PARC's *Colab*

Environment. It's Unix-based software that consists of a forms-based user interface, where you either design or use existing business forms as the basis for automating procedures among a group of people.

Context is technical documentation software from Context Corp. It's a good example from a document creation and production standpoint, because it combines the notion of multiple authors working on the same document with tracking of all revisions that were either proposed or made. So you just make the changes once, and then they ripple through this data base.

So there aren't really any products from the major vendors?
Not yet. Except HP's New Wave environment. And Lotus recently announced its Notes application [CW, Feb. 29].

What is behind this concept? What are the capabilities it provides that traditional ways of computing do not?
As we've automated offices with electronic mail, calendars, scheduling programs, word processing and data bases, one of the things we find is that it's not really any easier for groups of people — as groups — to get work done.

So, since we're all doing a lot of work on computers, it's a matter of getting to the point where the computers get into the act. Instead of being passive, they start to become more intelligent.

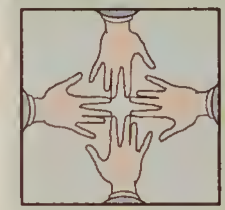
Another reason is simply the notion of cooperative work, where with five or 10 people working on a project, we all need access to the same supporting data. We all need access to each other's notes and thoughts. We all, basically, want to have our own windows into the common set of information and have it set up in such a way so that we can be polite. We can make suggestions to each other without going in and clobbering what somebody else is doing.

I think we're now at the next stage. We have a lot of applications that empower individuals, and we now have the communications infrastructure in place so we can start moving beyond that.

Groupware

Selected products that facilitate work group computing

- **Context**, Context Corp., Beaverton, Ore.: A networked environment that allows multiple authors to produce and make changes in technical design documentation; Context helps coordinate and track the changes



- **New Wave**, Hewlett-Packard, Palo Alto, Calif.: An operating environment that works with Microsoft's Windows 2.0 to facilitate object management; allows group members to move data across applications and to create compound documents of objects, such as graphics, text and voice; provides an agent function for procedural automation
- **The Coordinator**, Action Technologies, Emeryville, Calif.: An electronic mail product that helps track requests or commitments made by or for group members
- **Life**, Motorola Computer Systems, Cupertino, Calif.: A family of Unix-based software with a forms-based user interface; helps group members design or use existing business forms to automate group procedures

CW CHART

Is MIS prepared for work group computing?
I think there's beginning to be enough written about it so that it may not sneak up on MIS managers.

I would suggest that what they should do is see the parade and run around and get in front of it and try to get themselves educated about the phenomenon and about the different kinds of tools and implications before their users really start clamoring for it.

Can MIS bring work group computing to upper management as a strategic weapon for enhancing competition?
Not yet. We don't have enough applications out there. 1988 will be the time when everybody will begin to identify the need for this kind of environment, a work group computing environment that goes beyond just PC LANs. And it will also be the year in which many of the underpinnings are put in place.

Is anyone actually practicing work group computing?
I don't know of anything beyond pilots per se, other than in specific areas like technical documentation and engineering.

Any final words of wisdom or advice for people who might be thinking about work group computing?
Before people start automating how groups of people work together, it's real important that they understand how groups of people work together. I would strongly recommend MIS managers and user departments thinking along the lines of doing computer support of cooperative work to get some training in working together as a team — whether it's team building or any of the communications workshops people can take.

We have to understand the notion of synergy — when you really get a group that's hot and clicking.

One of the things that's relevant from a computer support standpoint is that a group of people working well together tends to operate in consensus mode. And with consensus, a single dissenting voice can change the whole direction that a group moves in. From an implementation standpoint, then, you realize you've got to make sure everybody has an equal opportunity.

And there may be cases where anonymity is desired so people don't make judgments about the value of a contribution based on who they think said it.

There are a lot of soft sides to this issue that I think need to be looked at before we run around and put it up on computers. ●

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MANAGEMENT

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Robert H. Trent

Cornerstone for survival

Entrepreneurship has long been a cornerstone of management thought.

Recently, management theorists coined the term "intrapreneurship" to describe ventures, usually aimed at developing new products generated within an organization. The practice was inspired by the need for entrepreneurial and innovative thinking in large corporations grown bureaucratic to the point that new ideas tended to be stifled. Notable examples of intrapreneurship include the development of Post-it Note Pads at 3M and IBM's Personal Computer.

In parallel with intrapreneurship, a similar activity, perhaps best described as "infopreneuring," has emerged within many corporations. This phenomenon is getting a lot of attention in management literature in conjunction with the use of information and information technology to gain competitive advantage. Numerous examples of it are already well known, such as the development of customer-oriented systems by American Airlines, American Hospital Supply and Merrill Lynch.

In an indication of top managers' recognition of the importance of information and its role as an integral part of corporate strategic planning, many companies have appointed a senior officer responsible for providing information and related technology where and when it is

Continued on page 76

Bottom-line philosophy motivates Seafirst MIS

BY STEPHEN JONES
CW STAFF

SEATTLE — It seems appropriate that the MIS department of Washington's largest bank is preoccupied with dollars and cents, scratching to save money at every turn to help improve the overall corporate bottom line.

While such belt-tightening concerns are not exclusive to MIS shops in the banking industry, Seattle First National Bank, known as Seafirst, takes an almost obsessive approach to saving money.

"We don't allow traditional cost containment; we use cost reduction, which means, 'I don't care what you have to do, just make the cost go down,' " said Timothy Turnpaugh, executive vice-president of Seafirst's operations group and director of MIS.

Shuffling systems, people

Turnpaugh has helped lead Seafirst's MIS shop through a major reorganization during the last three years, changing mainframe systems twice and placing a personal computer on the desk top of nearly every bank employee.

Part of that restructuring involved some big employee layoffs. Since 1985, the MIS work force has been cut by 40%, down to about 100 employees today.

Some of the most drastic staff cuts were made, Turnpaugh said, because Seafirst had managed to install the hardware and software equivalent of two separate MIS shops. Thanks to a slipshod method of acquiring big iron in the late 1970s and early '80s, the bank was running systems from both IBM and Honeywell, Inc.

Cutting down

With each mainframe demanding its own development and support staffs, the first decision became a very easy one: eliminate one of the money-guzzling systems.

The migration from Honeywell to IBM hardware was originally budgeted to take five

Continued on page 76

Data View

Help wanted

Most frequently cited suggestions for improving the workplace, from a survey of 494 Computerworld *readers*

	Percent of respondents
Improve communications, interaction and information needed for teamwork	12.1%
More recognition of MIS/DP employees	10.1%
Better long-range planning, planning ahead and setting goals	9.5%
More professional, stable management	8.3%
More respect, recognition or rewards for good work	8.1%

INFORMATION PROVIDED BY CW PUBLISHING, INC.
CW CHART

No time for games

GE's Ehrlich favors pragmatism over promises

BY ED SCANNELL
CW STAFF

It's easy to label Jeff Ehrlich a cynic. Afer listening to a few terse comments about vendors who always deliver less than they promise and how some don't understand corporate computing needs, one might recommend he spend a couple of weeks on the beach.

But what may be construed as cynicism is his own steely brand of pragmatism that precisely separates what vendors can deliver to General Electric Co. today from what they merely promise to deliver sometime in the future.

"I have to be pragmatic about what works and what doesn't work," he says. "We are interested in simplicity and usability. I don't have the time to fool around playing games with vendors."

Ehrlich really doesn't have time to fool around. As manager of product technology for GE's Corporate Information Technology group, he is responsible for piecing together a coherent strategy for GE's varied base of 40,000 microcomputer users as well as providing technological guidance for the company's 40 MIS managers.

An example of Ehrlich's pragmatic thinking was his decision to buy a large number of IBM's Personal System/2 series machines but to hold at arm's length IBM's yet-to-be-delivered OS/2 Extended Edition and Systems Application Architecture (SAA).

He justifies the purchase of thousands of PS/2s during the last year by saying they represent a significant improvement in functionality and cost over IBM's Personal Computer series.

He refuses to become an OS/2 or SAA loyalist, however, until IBM is ready to deliver and prove to him the products' technological worth.

"There is a tendency in this business to talk about what is going to be — and that's fine and sometimes even important. But it doesn't wash away what is," Ehrlich says.

Ehrlich works with what he describes as a close-knit group of 10 people at GE's mammoth

Continued on page 74

PROFILE

Jeff Ehrlich

BIGNOLO STUDIO

Position: *Manager of product technology for General Electric's Corporate Information Technology Group*

Mission: *Develop a strategy for integrating GE's 40,000 microcomputer users into myriad of emerging technologies*

Inside

- IBM user group Guide donates proceedings to Carnegie-Mellon. Page 75.
- IRS extends electronic filing program for business tax returns. Page 74.

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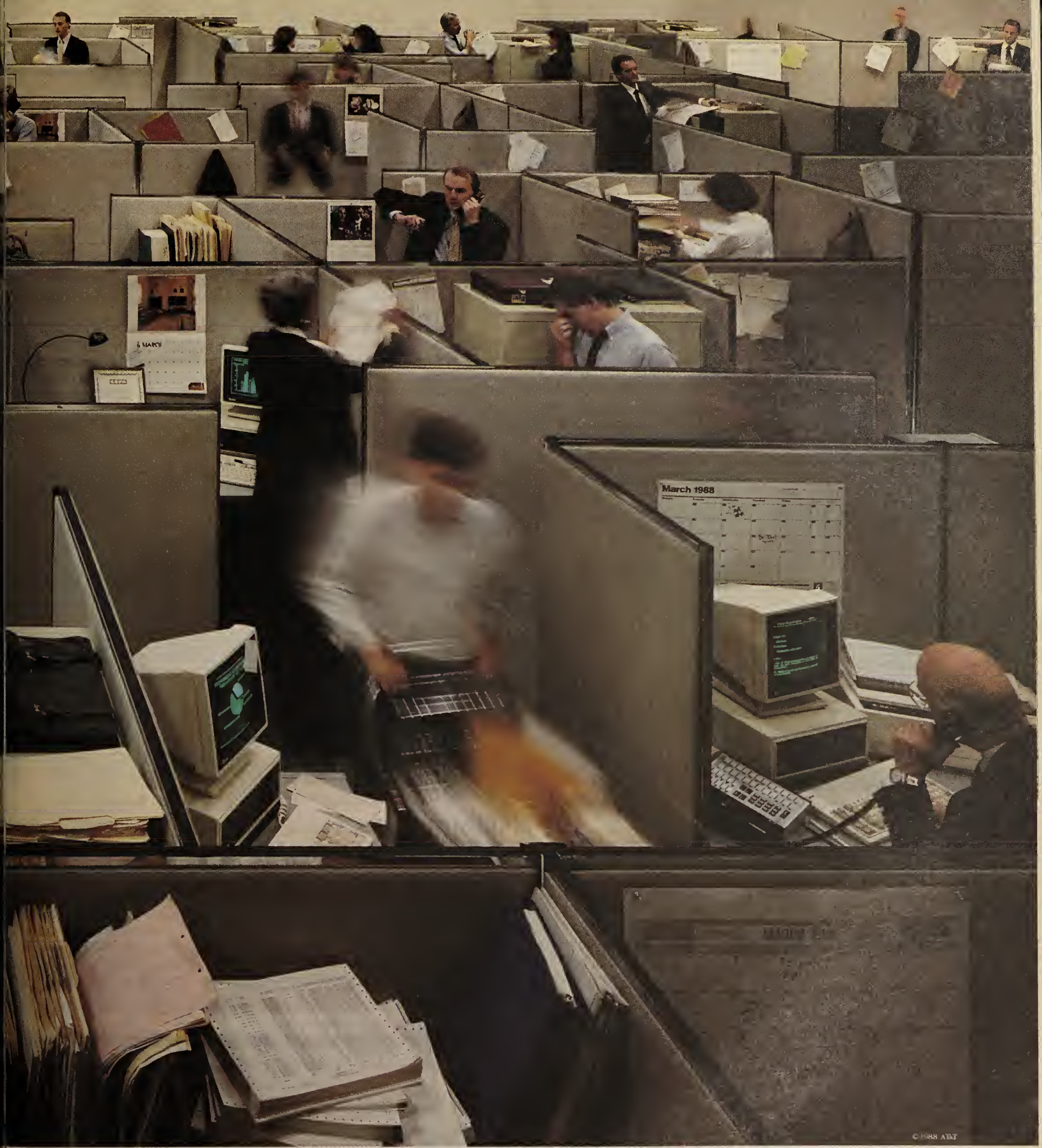

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Ehrlich

CONTINUED FROM PAGE 71

plant in Bridgeport, Conn. He says he doesn't believe in formal meetings to direct his group but prefers informal and sometimes spontaneous meetings among three or four staff members.

"We talk to each other all day, every day. There's too much action [to take time out] for formal meetings," he says.

Those who work with Ehrlich say they respect his pragmatic decision making abilities as well as his flexibility.

"He's very objective, which is important," says one co-worker who asked not to be identified. "Some people aren't and will get locked into something they don't want to do, even if it's wrong. I've never seen that with him."

An example of that flexibility was Ehrlich's decision to integrate a significant number of Apple Computer, Inc. Macintoshes into a company that already had 40,000 IBM PCs and compatibles. His decision to do so was based purely on the Macintosh's ability to deliver superior price/performance immediately, unlike IBM's promises to deliver similar capabilities sometime in the future.

The action is fast-paced at GE. With 40,000 users, GE is the target of hundreds of sales agents from all corners of the vendor community. Ehrlich says he regularly listens to half a dozen sales pitches a day from vendors visiting his office and from many more over the phone.

Besides managing his own business, Ehrlich says he has to know as much about the businesses of vendors and dealers as they do. "We know the business of building and selling computers very well here," Ehrlich points out.

Ehrlich has come up with a variety of techniques to manage the mountain of vendor information he constantly faces. Although he is reluctant to give away trade secrets, he says developing the ability to evaluate a product's worth in 10 minutes and to skim journals and technical reports for key facts is invaluable.

No matter how well he manages his time, however, the nature of the business forces him to think about it long after he leaves the office, he notes. Most people in his line of work have no conscious beginning or end to their jobs, he says.

"This is not an 8 to 5 job. If it was just a job to you, you couldn't do it. There is just too much to know," Ehrlich says.

When he does relax, Ehrlich says he still feels a compulsion to be challenged. He turns his favorite hobby, sailing, into a different sort of technology project. "Sailing, to someone else, is a classic vacation. But for me, it involves a lot of planning and worrying about navigation, anchoring and the weather; it's a project. The brain doesn't get tired like a set of muscles," he says.

Back at the office

On the nontechnical side of his job, Ehrlich has a formula for hiring people that involves some degree of intuition. He says

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IRS expands filing program

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Internal Revenue Service continues to expand its program for electronic filing of business tax returns. The IRS recently said it will permit businesses to transmit employee pension plan returns, specifically Forms 5500C and 5500R, beginning in June.

The increasingly popular program allows businesses to file returns either by sending standard half-inch magnetic tapes or by transmitting the data at 4.8K bit/sec., using CCITT X.25 or IBM 3780 bisynchronous protocols, said Allan Firestone, an IRS programmer/analyst.

During a pilot test last year, 2,168 fiduciary and partnership returns (Forms 1041 and 1065) and 65,862 related Schedule K-1s, were filed electronically, the IRS reported. Gradually, the IRS is opening the program to new categories of filers this year, including Subchapter S corporations.

The IRS estimated that participating firms will transmit about 100,000 returns and 750,000 Schedule K-1s for the year. The IRS had no estimate on the volume of employee pension plan returns to be transmitted, but officials noted that they have received about 150 requests for information on procedures for transmitting these returns.

So far this year, about 70 firms have signed up for the program in order to reap the benefits of electronic and magnetic media filings, IRS officials said.

For example, the program permits the IRS to immediately acknowledge receipt of the return and quickly resolve errors, officials said. Also, corporate officials can use a consolidated signature form, which greatly reduces the amount of paper to be signed.

"The program is gaining wide acceptance because businesses have found significant savings in not having to print large volumes of Schedule K-1s," an IRS statement said.

Firestone said limited partnerships must print and fill out two Schedule K-1s for every partner, which in some cases may number in the thousands. With electronic or magnetic media filing, the partnership does not need to print or send the thousands of forms to the IRS, and certain IRS filing requirements are relaxed.

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Exhibitor listing as of 12/30/87. In June, over 500 exhibitors will participate.

candidates have to be smart but that he has a bit of trouble defining that term.

Being smart "is more than just intelligence. [Candidates] have to be action-oriented. We have a lot of work to do here, with a short amount of time and limited resources. We need people who are decisive and who can defend their decisions," he says.

An employee at GE for 20 years, Ehrlich has been involved in managing everything from mainframes to micros. He has been in his current position for the last five years.

Although he holds an engineering degree from the University of Rhode Island and master's degrees in business administration and computer science from Rensselaer Polytechnic Institute, Ehrlich places a high value on experience. "I have some degrees, but there is no substitute for experience," Ehrlich says. "You can learn more from failures than success."

Although he can't point to specific failures he has experienced at GE, Ehrlich says, his years as a manager have taught him about trading off the short term for the long term, recognizing no-win situations and the limits of his abilities. "One of the few benefits of getting older is that, hopefully, you get smarter," he says.

Ehrlich has no trouble selling new technology ideas to corporate management — an enviable position for any manager of technology. He says corporate management assumes he is on top of all situations and will make the right decisions. GE Chairman and Chief Executive Officer "Jack Welch has other things to worry about besides PCs. That's what he's paying me for," Ehrlich says.

According to Ehrlich, the biggest challenge GE faces over the next two or three years is integrating its massive base of microcomputers into the various technologies just now beginning to emerge from companies such as IBM, Apple and Microsoft Corp. To meet this challenge, GE will have to decide which one to move to and, more importantly, when.

"If you move too soon, you'll waste tremendous amounts of money in conversion costs. If you wait too long, you're looking at obsolete equipment. It's like a poker game, you have to know when to bet," he says.

> "THERE IS A TENDENCY in this business to talk about what is going to be — and that's fine and sometimes even important. But it doesn't wash away what is."
>
> JEFF EHRLICH
> GENERAL ELECTRIC CO.

Guide donates archives to Carnegie-Mellon

The IBM large-system users group Guide International Corp. recently donated materials tracing 30 years of its meetings to Carnegie-Mellon University's Engineering and Science Library in Pittsburgh.

The Guide archives, made up of bound conference proceedings, will be available for use by graduate students in computer science study and research, according to Guide officials. Former Guide President John E. Nack, of Caterpillar, Inc., initiated the donation drive and said the proceedings chronicle Guide's role in the evolution of information systems technology.

The archives include information from each of Guide's 66 meetings between 1956 and 1986.

Guide, composed of representatives from 2,850 corporate computer installations, meets three times a year to discuss and work with IBM on current computer problems and future product directions.

6th Annual PC EXPO in New York Seminar Series

Tuesday, June 21

Keynote: Ned C. Lautenbach, Vice President, IBM Corporation and President of its National Distribution Division.
Management Overview of LANs/Terms & Technology*
Software 1989: What Corporations Can Expect, What Users Want
Selecting a Desktop Publishing System
CASE: A Primer
Making the VAX Connections*
CD-ROM
Security Decisions in a Microcomputer Environment
80386 and Beyond
Distributed Database Management Systems*
Modern Clones and the Corporate Marketplace
Legal Issues in the Technology Field
Costs and Benefits of Microcomputers

Wednesday, June 22

Dealing with the Inevitable: Departmental Systems
The Macintosh in the Corporate Environment*
Artificial Intelligence/Expert Systems
Softline: Candid Comments from Industry Leaders
Network Management: Keeping Your Network Running*
Desktop Publishing — What Corporations are Doing
Electronic Mail and Beyond*
Vendor Quotas: Their Impact on Resellers and End Users
The Backbone's Connected to the....TCP/IP and Other Protocols*
Promoting Responsible End-User Computing
Enhancing Your Computer Graphics
LANs — User Views*
Portable Computers
Micro-to-Mainframe Connections*
Latest Developments in Spreadsheet Software

Thursday, June 23

How to Grow your Net*
Executive Information Systems
The Changing Concept of an Information Center
Workgroup Computing*
New Lives for Old — What to do with Out-dated Equipment
Micro-to-Mini Connections*
End-User Support
Software Support and Upgrades
OS/2 and Networking*
Microcomputer Maintenance
Current Training Issues
LANs and Multiuser Systems*
Implementing Project Management
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Registration fees must be in U.S. funds. All foreign mail orders, except Canada, must be received by May 13, and such badges will not be sent by return mail, but held at the "Pre-registered attendee" counter for pick-up on arrival. All registrations are non-refundable. Confirmation for all registrations will be sent by PC EXPO upon receipt of your registration form and payment.

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Seafirst

CONTINUED FROM PAGE 71

years, but Turnpaugh claimed to save $13 million by completing the plan in just 16 months.

It recently became clear to Turnpaugh and his staff, however, that even more money could be saved by replacing Seafirst's IBM 3081 with a National Advanced Systems (NAS) XL/80.

Seafirst's Turnpaugh

According to Turnpaugh, the move to NAS brought a 70% increase in mainframe horsepower and a significant decrease in monthly system payments. The drive to conserve dollars also led Seafirst to standardize on Apple Computer, Inc.'s Macintosh in 1985.

Starting with 128K-byte machines that have since been upgraded to 512K bytes, Seafirst now uses more than 3,000 Macintoshes for both text and financial data processing.

Turnpaugh said the Mac was chosen because its ease of use helps reduce user training costs.

He added that training makes up 75% of the cost of owning a PC in the first three years.

Cost-cutting rampant

Cost-cutting measures have been applied to every level of the data processing operation — even nontechnical areas, according to William Browne, vice-president of systems services at Seafirst.

In 1987, Seafirst trimmed $1 million from its MIS budget by cutting the department's paper output by nearly 27 million sheets, down to 101 million pages a year.

"We had enough paper to line a path from here to Chicago and back, but once we decided it had to go, it was out of here," Browne said with a snap of his fingers.

Trent

CONTINUED FROM PAGE 71

needed throughout the organization.

Characteristics of an effective chief information officer include the following:

- A thorough understanding of the business in which the company is engaged.
- Conceptual and technical skills sufficient to develop and manage information resources.
- Infopreneurial instincts to find entrepreneurial and innovative ways to acquire and use information in the pursuit of corporate goals.

There are several strategies executives can use to identify and take advantage of infopreneuring opportunities.

One is to review strategic plans to ensure that information is specifically considered in the formulation of corporate strategies. Information is a corporate asset and should be treated as such.

Another strategy is to assess the role of information both as enhancements to existing products and as potential new products. Objectives here are increasing market share, maintaining a market advantage or inhibiting new entries to the market.

Executives can also examine the role of information as an important component of production and administrative processes. The objective here is to lower costs or change processes.

Other possible moves include these:

- Develop an information plan linked explicitly to the strategic plan, involving all senior functional area executives in the process and encouraging an infopreneurial attitude on their part.
- Include in the information plan strategies for acquiring information externally; intelligence gathering can be an important component of infopreneuring.
- Establish the position of a chief information officer charged with implementing the information plan.
- Insist on measuring the investment and the return on information technology.
- Require that planning and budgeting documentation and internal financial statements provide explicit information about revenue and costs (both capital and operating) related to information acquisition, processing and use.

Clearly, the needs outlined above are more immediate to companies in industries that are highly information intensive, such as financial services.

However, the realities of the information age in which we live seem to require that prudent managers consider new ways to maintain or improve their competitive position. In some cases, survival itself may well depend on who is the best infopreneur.

Trent is the Ralph A. Beeton Professor of Free Enterprise at the University of Virginia's McIntire School of Commerce.

CALENDAR

MARCH 20-26

1988 Annual Conference of the National Automated Clearing House Association (NACHA '88). Dallas, March 20-23 — Contact: Barb Hill, Suite 640, 1901 L St. NW, Washington, D.C. 20036.

Campstan '88 Computer Standards Conference. Washington, D.C., March 21-23 — Contact: Computer Standards Conference, c/o Computer Society of the IEEE, 1730 Massachusetts Ave. NW, Washington, D.C. 20036.

MARCH 27-APRIL 2

International Congress on CIM Databases '88. Cambridge, Mass., March 27-29 — Contact: Kim Takita, CAD/CIM Alert, 824 Boylston St., Chestnut Hill, Mass. 02167.

ISSA '88. San Francisco, March 27-30 — Contact: Information Systems Security Association, P.O. Box 10246, Newport Beach, Calif. 92658.

The Candle Performance Conference. San Francisco, March 27-April 1 — Contact: Candle Education Registration Office, 1999 Bundy Drive, Los Angeles, Calif. 90025.

Interface '88. Chicago, March 28-31 — Contact: The Interface Group, Inc., Registration Department, 300 First Ave., Needham, Mass. 02194.

1st Annual World Congress on Computing (WCC). Chicago, March 28-31 — Contact: The Interface Group, Inc., Registration Department, 300 First Ave., Needham, Mass. 02194.

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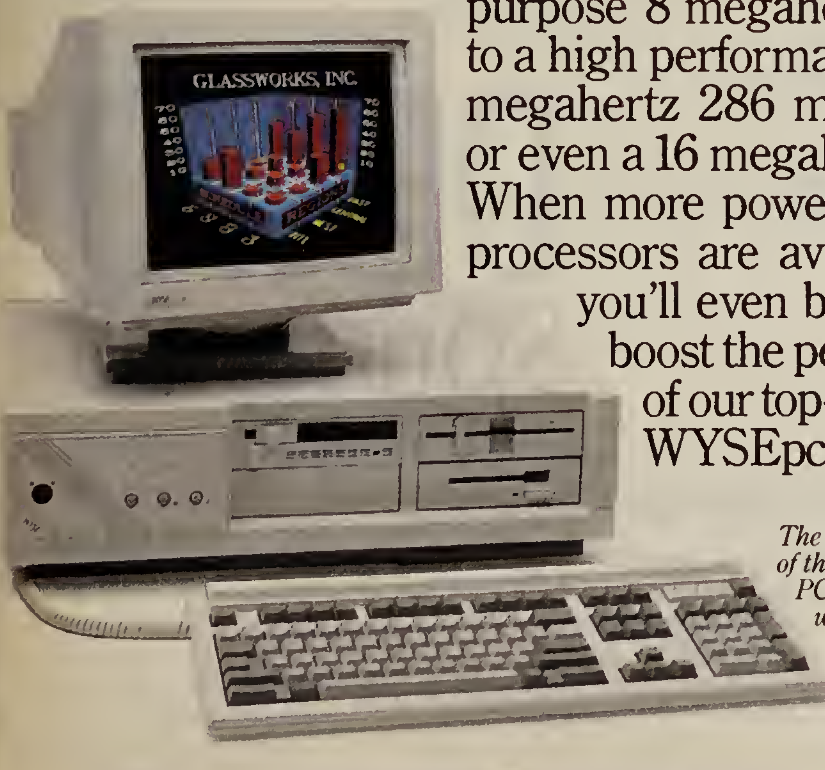

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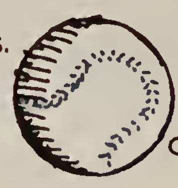

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

William Zachmann

Unix: Maybe good enough

Even on the basis of quite recent surveys, one might readily conclude that interest in Unix on the part of corporate information systems professionals ranks somewhere below the Soviet Union's interest in free elections in Eastern Europe. "Who needs it?" seems to be the attitude in most corporate computer centers.

The typical large organization is accustomed to dealing with a multiplicity of proprietary environments, and moving data among them can be a bother. But, contrary to the widespread hysteria about lack of connectivity options, practical solutions are available for most of the practical problems users have. It isn't absolute lack of connectivity solutions that is the problem as much as the costs in time and effort to implement them.

Adding Unix simply means adding yet another environment — an unfamiliar one, at that. Its immediate effect is to further complicate matters rather than simplify them.

Even though Unix doesn't offer much to the chief information officer concerned about whittling away the applications backlog, Unix is likely to become a key part of most organizations' use of information technology during the next several years.

Hardware economics

The single most important reason has less to do with Unix than it does with the economics of hardware technology. A growing number of more capable microprocessor-based system products are starting to offer minicomputer- and even mainframe-class power at microcomputer prices.

Unix, beyond any question, is the operating system of choice for these ever more powerful microprocessor-based multiuser systems. It isn't that Unix is perfect. Rather, it is that Unix is good enough to deliver the superior price/performance ratios of microprocessor technology in minicomputer- and main-

Continued on page 82

Cullinane re-enters fray: 'I was never really gone'

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — John J. Cullinane has accomplished a lot of things so far in his 53 years; retirement is not one of them.

Last week, less than six months after ceding the chairmanship of Cullinet Software, Inc. to his own chosen successor, David L. Chapman, and two months after rejoining Cullinet's board of directors, Cullinane was appointed vice-chairman of the company he founded.

"In many ways, I was never really gone," Cullinane said.

Market analysts agreed. Even during the months when Cullinane had no official company position other than that of consultant, "he was still there, more so than may have been appparent," said W. Christopher Mortenson, an analyst at Alex Brown & Sons, Inc. As a consultant, Cullinane maintained an office at company headquarters; as a board member, he occasionally accompanied executives on visits to customers.

"In many ways, this is just an official recognition that he's taking a more active role in sales and marketing and that he's never going to totally extricate himself from the company," Mortenson said.

"It takes more than one mind to run the business," Chapman said.

Seeing red

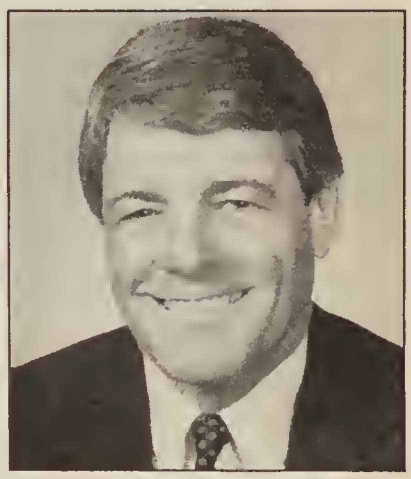
Cullinane's return to the board in December prompted speculation that the founder, who owns approximately 2.2 million shares of Cullinet stock, was less than satisfied with the continuing red ink on the company's balance sheet.

Continued on page 82

CDLA president dies

Benton's energy praised by leasing industry

BY JEAN S. BOZMAN
CW STAFF



CDLA's Benton

WASHINGTON, D.C. — James F. Benton, president of the Computer Dealers and Lessors Association (CDLA), died last week of a heart attack at his suburban home here. An energetic advocate of the leasing industry and an avid tennis player, Benton, 57, died several hours after completing five sets of tennis last Sunday, the CDLA said. A funeral was held in McLean, Va., on Thursday.

Benton was remembered last week by CDLA associates as a man of great energy, whether on Capitol Hill, where he lobbied for leasing industry issues, or on the tennis court, where he played Secretary of State George Shultz, *Washington Post* owner Katherine Graham and various congressmen and senators.

His accomplishments include improving the CDLA's relationship with IBM. CDLA members lease or sell about 30% of all IBM mainframes.

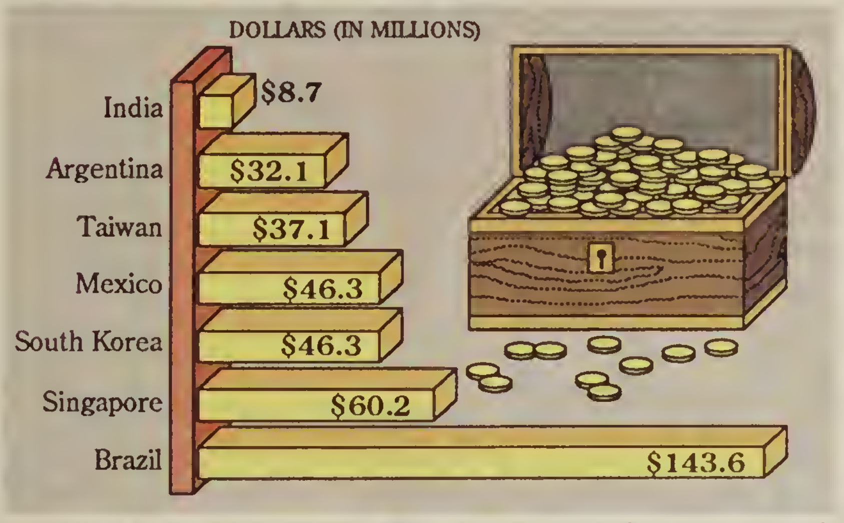
"Jim had a knack for getting things done," said Ken Bouldin, chief executive officer of Econocom USA, a Memphis leasing firm. "In our relationship with IBM, CDLA was another cus-

Continued on page 81

High-tech pirates said to reap billions

Plundered loot

U.S. software companies lost revenue estimated at $374 million in 1986 as a result of piracy in overseas markets



INFORMATION PROVIDED BY DEWEY, BALLANTINE, BUSHBY, PALMER AND WOOD
CW CHART: FRANK C. O'CONNELL

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A recent study by the International Trade Commission (ITC) found that inadequate foreign protection of copyrights, trademarks and patents cost the U.S. computer and software industry $4.1 billion in 1986.

The ITC study, based on a survey of 47 computer firms and 52 software firms, cited the major offenders as Brazil, China, India, Indonesia, Japan, Mexico, Korea, Taiwan and Thailand.

The study is one of two reports issued late last month that estimate the high costs of piracy of U.S. computer, software and semiconductor designs. They are expected to bolster the industry's lobbying efforts for U.S. trade policies that encourage foreign nations to protect intellectual property rights.

The Reagan administration recently launched a campaign for a multinational agreement on intellectual property rights under the auspices of the General Agreement on Tariffs and Trade.

Continued on page 82

Inside

- Electronics, chip industries join to end dynamic RAM shortages. Page 80.
- Tandem takes $6M loss in shareholder suit settlement. Page 80.

Seeded by IBMers, Netlink grows in the shadow of SNA

BY ELISABETH HORWITT
CW STAFF

RALEIGH, N.C. — A small, feisty young third-party IBM Systems Network Architecture vendor has been flourishing here, literally in IBM's shadow.

Located just a few miles from IBM's Computer Products Division in nearby Research Triangle Park, Netlink, Inc.'s business is enhancing IBM SNA networks. "Some things, like multivendor connectivity, IBM is not going to address in serious ways," said Paul Wood, Netlink's founder and chairman.

For four years, Netlink's SNA gateways, hubs and concentrators have continued to provide customers with value-added capabilities that they still cannot obtain from IBM. This despite the computer giant's recent juggernaut of announcements aimed at filling the gaps in its communications architecture.

Netlink owes much of its ability to stay a step or two ahead of the latest IBM SNA update to a

Continued on page 81

Up & Coming: *Netlink*

Location: Raleigh, N.C.
Year founded: 1984
Chairman: Paul Wood
Employees: Approximately 100
Product line: IBM SNA communications processors and gateways
Of note: Key positions held by former IBM employees with 10 or more years' experience in SNA-related products and strategies.

U.S. chip makers aim to fight unfair trade

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — U.S. semiconductor producers and their customers concluded a rare summit meeting recently, resolving to end shortages of memory chips and fight unfair trade practices by foreign producers.

The American Electronics Association and the Semiconductor Industry Association (SIA) issued a first-ever joint statement that emphasizes the interdependence of the two industries. Horace McDonnell, chairman of Perkin-Elmer Corp., likened the relationship to the food chain, as the electronics industry relys on a strong chip industry.

The nine-point statement discusses the need for an adequate supply of dynamic random-access memory chips and urges U.S. producers to reenter the dynamic-RAM market. It also encourages the U.S. government to ensure that Japan provides a fair allocation of Japanese 1M-byte dynamic RAMs to the U.S. market.

Chip users have reported shortages of dynamic RAMs, but U.S. producers are wary of investing in increased RAM production without protection against Japanese dumping and full access to world markets, officials said.

Jonathan E. Cornell, head of Harris Corp.'s semiconductor division, said that U.S. suppliers have begun to expand production of dynamic RAMs now that U.S. trade sanctions have stopped Japan from selling them below cost.

However, he said, "to provide adequate return to undertake these investments, [U.S. producers] need confidence that they will not be damaged by future predatory pricing." Thus, to stimulate investment in dynamic RAM production, the joint statement encourages long-term purchase agreements between chip suppliers and individual customers.

In a related development, the SIA warned that the U.S. trade sanctions against Japan may need to be revamped or increased if U.S. semiconductor firms do not obtain greater access to the Japanese market.

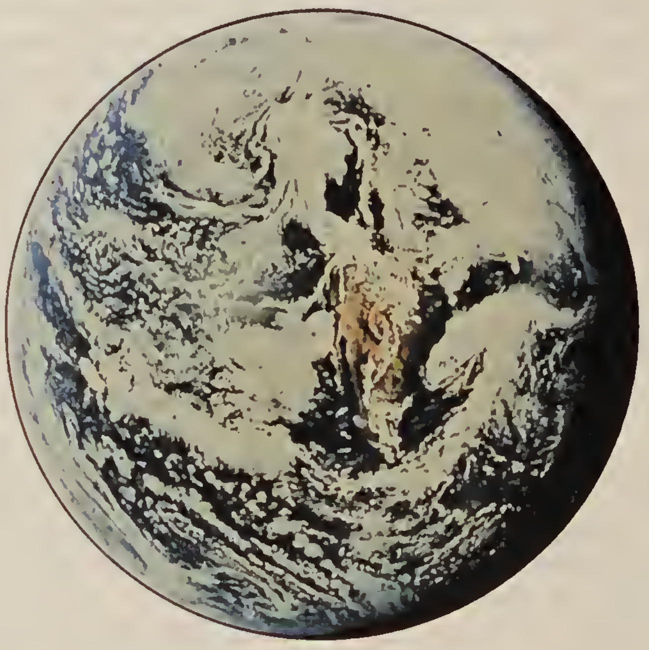
Despite substantial efforts by U.S. companies operating in Japan, only limited progress has been made on the market access issue, said Cornell, chairman of the SIA's public policy committee.

INDUSTRY WEEK IN BRIEF

Tandem Computers, Inc. will take a $6 million charge against its earnings in the current quarter as a result of the settlement of a 1984 shareholder class action lawsuit. The suit stemmed from Tandem's 1982 scrape with the Securities and Exchange Commission (SEC), in which the SEC charged the vendor with inadequate accounting practices after Tandem restated its 1982 financial results.

The U.S. semiconductor market shifted into high gear last month as orders hit their highest level in more than three years and shipments showed strength, according to figures released by the Semiconductor Industry Association. February shipments reached $902.5 million, a 6% increase over January's figure and a 30% rise over year-earlier shipments. Average monthly orders for the three-month period ended Feb. 29 totaled $1.07 billion.

Storage Technology Corp. unveiled a high-level shuffle with the announcement that Vice-Chairman and Board of Directors Member Stephen Jerritts will leave at the end of next month.



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Netlink

CONTINUED FROM PAGE 79

cadre of executives the company lured away from high positions of responsibility on IBM SNA projects in Raleigh. Wood himself spent 10 years designing and testing SNA networks at IBM Australia.

"We've attracted a lot of IBM SNA people because we are a small group that can offer them the flexibility to build products without the management and laboratory politics that go on in IBM, which tend to stifle some of the best guys," he said.

The company's products are now installed at major corporations such as Automatic Data Processing, Inc. (ADP), Westinghouse Electric Corp. and Aetna Life and Casualty Co.

Rave reviews

"People I have talked to have been very impressed with the caliber of their team, and I don't think anyone is doing quite what they are on the hardware side," said Clare Fleig, director of systems research for Los Altos, Calif., research firm International Technology Group.

Three years ago, when Netlink was just getting started, ADP decided to buy Netlink's flagship product, the 3703 Network Processor. By providing asynchronous connections between customers' personal computer-based payroll workstations and ADP's IBM hosts, the 3703 saved the financial service bureau from having to add more expensive synchronous ports or more IBM 3725 communications processors, according to ADP vice-president of support systems William Meilahn.

"We picked Netlink because it had such a flexible box, whose capabilities were uniquely suited to our needs, at lower cost than anything else we had at the time," Meilahn said.

Netlink's Wood

ADP's initial nervousness about going with a start-up was soothed by the quality of Netlink's equipment and support. ADP was also reassured by testimonials from overseas firms that had bought the 3703 from Systems Technology Pty. Ltd., Netlink's predecessor and current Australian subsidiary, founded by Wood in 1982. ADP was impressed by the number of former IBMers on staff, Meilahn said. ADP has worked extensively with Netlink's vice-president of planning, David McCormick, a former marketing and product development manager for IBM's communications processor line.

Netlink's strong in-house SNA expertise has helped ensure that its customers are not left stranded with obsolete connections to their IBM installations, Wood indicated. Now, Netlink is trying to sell its SNA products and experience to other vendors — in particular, local-area network vendors that need help linking their products to IBM SNA architectures, Wood said.

Netlink also is seeking partnerships with systems vendors that want to improve their SNA connections. During Netlink's last round of financing, Tandem Computers, Inc. invested an undisclosed amount and entered a joint development and resale agreement with the company.

Tandem's backing came at a critical time for Netlink, which had underestimated the amount of time and up-front capital it needed to get its products out the door, according to Fleig. While the market, the team and the products are there, Netlink still needs to become better organized in bringing products from the prototype stage to the market, she added.

CDLA president

CONTINUED FROM PAGE 79

tomer that was always asking them to do things," Bouldin said. "But IBM had great respect for Jim Benton, and for that reason, we were able to get their agreement on some very adversarial and controversial issues."

One recent victory was winning deferral on a 1987 IBM maintenance plan that would have affected leased computers. "He brought a lot of professionalism to our industry, and for that, he will be missed," said Ken Pontikes, president of Comdisco, Inc. in Rosemont, Ill., one of the largest U.S. leasing firms.

Benton used the same conversational skills to convince nay sayers as he presided over the merger of the Computer Lessors Association with the Computer Dealers Association in 1981. After that, Benton was the executive director of the CDLA, a post he held until 1986, when he became president.

"He was a political master," said Tom Martin, president of Computer Financial, Inc. in Hackensack, N.J. "He got 350 members with 350 different ideas and priorities to reach consensus positions on the issues and to take political action on them."

Benton entered the leasing industry as director of the Computer Lessors Association. He took the job in 1970 after friends asked his company, Janus Consultants, Inc., a New York executive search firm, to fill the position. Originally an IBM marketing executive, Benton left IBM in 1967 as national industry marketing manager in Armonk, N.Y., to become marketing vice-president for a New York manufacturing firm. He became president of the firm, Farrington Manufacturing Co., in 1969.

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Zachmann

CONTINUED FROM PAGE 79

frame-class packages.

DOS-, and eventually OS/2-, based personal computer workstations can do many tasks previously reserved for larger systems. When networked and supplemented with network servers, they can do even more. However, for quite some time yet, it will be more traditionally configured multiuser systems that will offer the best options for large applications with large data bases, large computational requirements, large transaction volumes and large communications requirements.

Multiple microprocessor-based systems running Unix in one form or another will offer the most powerful alternatives to far more expensive minicomputer and mainframe systems for larger applications. They will thereby offer larger businesses some of the most attractive ways to take advantage of the lower costs microprocessor technology can provide.

It's so easy

Unlike workstation/server architectures, which are still very new and require time for organizations to learn to use effectively, multiuser Unix systems are very familiar to information systems professionals with a background in a mainframe or a minicomputer environment. It is much easier to go to designing and implementing applications under Unix than it is to master newer workstation/server architectures.

Who needs Unix? Well, the people who are responsible for the development and maintenance of major application systems in large organizations, for one. Unix may not be everything its wild-eyed proponents claim.

Unix is, however, probably the most important single delivery mechanism for major applications capability at microprocessor prices. That's going to make it pretty darn important for information systems professionals, whether or not they have taken much interest in it so far.

Zachmann is vice-president of research at International Data Corp.

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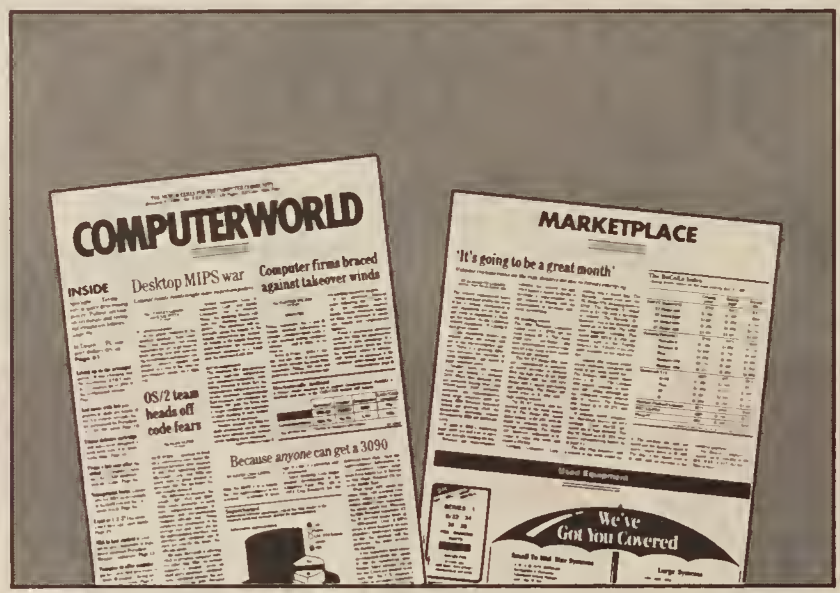
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High-tech pirates

CONTINUED FROM PAGE 79

John Pickitt, president of the Computer and Business Equipment Manufacturers Association (CBEMA), said foreign piracy causes the loss of U.S. jobs and the loss of profits that could be used to develop new products and technologies.

ADAPSO, the computer software and services industry association, expressed hope that the ITC report will bring to light the severe economic damage caused by software piracy and will reinforce the urgency of addressing the issue.

Not a good year

A second study, conducted by lawyers and economists at Washington, D.C.-based law firm Dewey, Ballantine, Bushby, Palmer and Wood, arrived at the following estimates for 1986:

- U.S. software companies lost a total of $374 million in sales as a result of piracy in the seven countries studied: Argentina, Brazil, India, Mexico, South Korea, Singapore and Taiwan.
- Brazil was the largest pirate of computer software, costing the U.S. software industry estimated revenue of $143.6 million.
- Sales of pirated computer technology reached $466 million in Brazil and $514 million in Taiwan.
- U.S. semiconductor companies lost $9 million in revenues because of the piracy of chip designs in South Korea.

CBEMA said it is concerned that the U.S. is about to lose a valuable negotiating tool for pressuring Asian nations to protect intellectual property rights. On Jan. 29, the Reagan administration said it would withdraw the duty-free status of Asia's "four tigers": Hong Kong, South Korea, Singapore and Taiwan.

In the past, the administration has used that duty-free status as leverage to pressure the countries into passing copyright legislation.

Cullinane

CONTINUED FROM PAGE 79

Cullinet, legendary in the early 1980s for its high rise and fast flight, ended 29 consecutive growth quarters with a loss in first-quarter 1986 and has yet to make it back into the black. A return to profitability in the fourth quarter of the current fiscal year, ending April 30, is an oft-stated goal and, according to Chapman, a reasonable expectation.

The ex-chairman's vice-chairmanship is unlikely to quell such speculation.

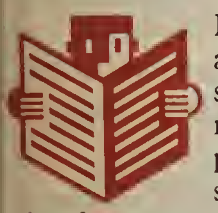
"Obviously, some people will see it as a vote of no confidence in the Chapman administration," Mortenson said. He said he is not among that group.

"Our view is that Cullinet has been involved in a very long and complex comeback plan," Mortenson said. "We never expected it to be fast." Cullinet officially announced a series of strategic redirections, including an ambitious entry into the Digital Equipment Corp. market, in autumn 1986; the company has already realized a number of its "blueprint" goals and is slated to ship its DEC VAX-based relational data base system and tools late this month. "They've been on target; they've met expectations," Mortenson said. "It looks like Chapman has been doing what needs to be done."

PC management up for grabs

Competition hot as MIS pros vie with users for the prize positions

BY ALAN RADDING
SPECIAL TO CW



MIS professionals seeking personal computer management positions face stiff competition from non-technical professionals in end-user organizations as well as their peers.

Also, unlike other computer positions, the PC manager post is not associated with a single department.

Candidates must find where the jobs are buried in the corporation. Growth in PC management positions within traditional information centers is slowing, giving way to microcomputer managers within end-user departments. At the same time, MIS is attempting, in many instances, to reassert its authority over personal computing and lay claim to the PC management role.

In large corporations, "growth of the information centers has flattened out, but user departments are now hiring their own PC managers," says Julian Horwich, executive director of the Chicago Association for Microcomputer Professionals.

These trends, combined with a large talent pool of PC experts from the technical and end-user areas, is causing a great deal of confusion when PC management positions are advertised.

Confusion reigns

For example, a national accounting firm recently received 100 replies when it advertised two PC management positions. The responses spanned the experience range from highly technical professionals to novices. Still sorting through the resumes, the partner conducting the search does not want his company's name published for fear of being inundated with more applicants.

The requirements for the PC manager position vary greatly from company to company. At the accounting firm, the true PC manager is the partner in charge of microcomputing. The PC manager handles training, installation and support.

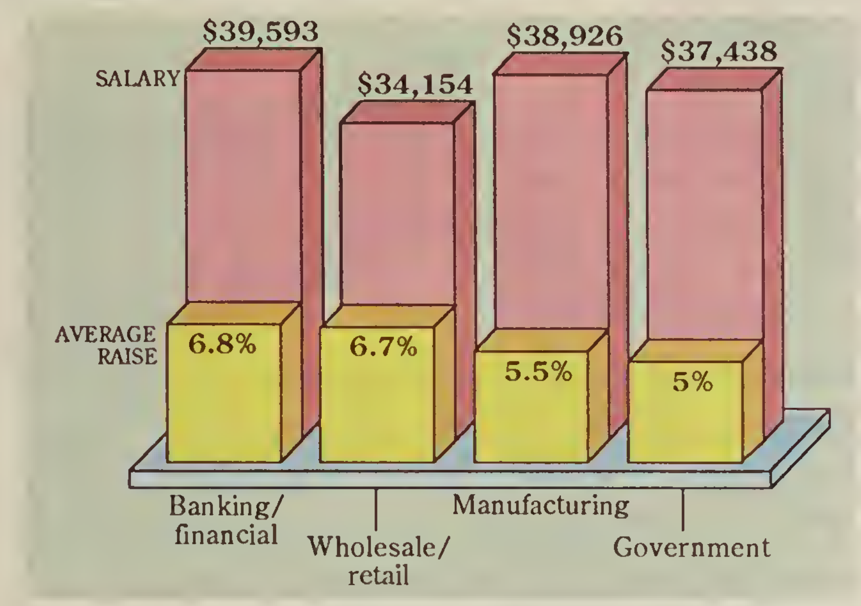
Job requirements vary

In the financial services industry, the PC manager at a large company may be the corporate peer of the MIS manager. At a large money center bank, the manager can be a full-fledged member of the management team with operational responsibility and budgeting authority for thousands of PCs and dozens of support staffers. The PC manager in a large bank, like his MIS counterpart, is involved in strategic planning, and it is not unheard of for them to compete against each other for information systems funds.

In general, PC management is evolving in two different directions: the information center and the applications developer, Horwich says.

Where you can earn the most

1,500 MIS professionals rate PC managers' average annual salaries and raises for selected industries



INFORMATION PROVIDED BY A *COMPUTERWORLD*/DATA PROCESSING MANAGEMENT ASSOCIATION 1987 SALARY SURVEY
CW CHART

The information center, the traditional setting for the PC manager, supports end users, provides training, installs systems, troubleshoots problems, plans purchasing and establishes hardware and software standards.

The PC manager of the classic information center typically ranks several levels below the MIS director in the corporate hierarchy.

On the applications developer side, the PC manager operates like a programmer analyst in an MIS department. The manager develops microcomputer applications to meet users' needs.

Both types of managerial positions require communications skills in addition to technical microcomputing knowledge. In both cases, the manager works closely with end users, says Jim Combs, managing director of the Boston offices of Source EDP, a job placement service.

Frequently the applications development position attracts people who come out of MIS with formal computer experience. Information center managers often come from nontechnical backgrounds such as teaching and administration.

General management?

Since PC managers are in close contact with general business users, some career advisors suggest that the position offers an opportunity to move into general management.

"They gain exposure to top management, but they can be boxed in if they are viewed as a techie," says Daniel Beckman, systems manager at Eliot Bank in Boston.

Eliot Bank is seeking a PC manager who will be a one-person department, but the bank is growing quickly and bringing more systems in-house, Beckman says. Under these circumstances, the position can evolve into one of greater responsibility.

Job opportunities for PC managers are expected to increase in the future. Corporate expenditures for PCs are expected to increase dramatically with the introduction of new hardware, software and networking, which requires technical administration and strategic planning.

Radding is a Boston-based author specializing in business and technology.

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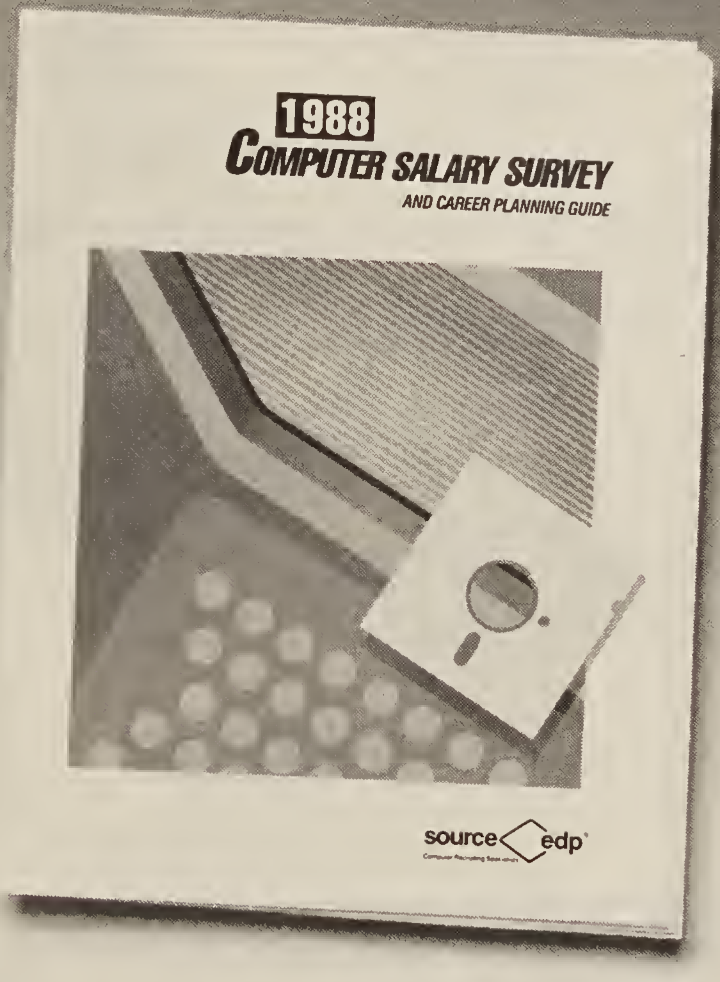

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The Sterling Research Group, the worldwide pharmaceutical research and development organization of Sterling Drug Inc., announces an opening for a Sr. Scientific Programmer/Analyst in the Computer System Development group at Sterling-Winthrop Research Institute.

The position involves all phases of systems development support for the Sterling-Winthrop Research Group Drug Regulatory Affairs and Research Planning and Administration groups. This work includes the analysis, design, development, implementation and documentation of systems.

Candidates should have a BS degree in a scientific or engineering discipline with a minimum of 3 years systems development experience. Specific experience should include development of products on IBM hardware. Knowledge of fourth generation computing languages and text management software is desirable. Good communication skills, both oral and written, are required.

Sterling-Winthrop Research Institute offers an attractive salary and benefits package with opportunity for professional growth. We are located near Albany, NY which is a center for summer and winter recreational activities.

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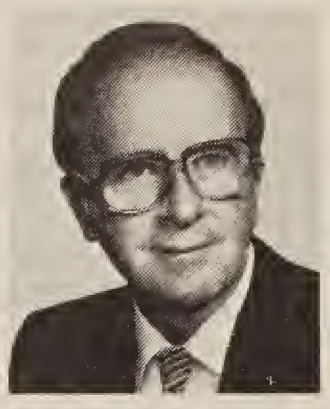

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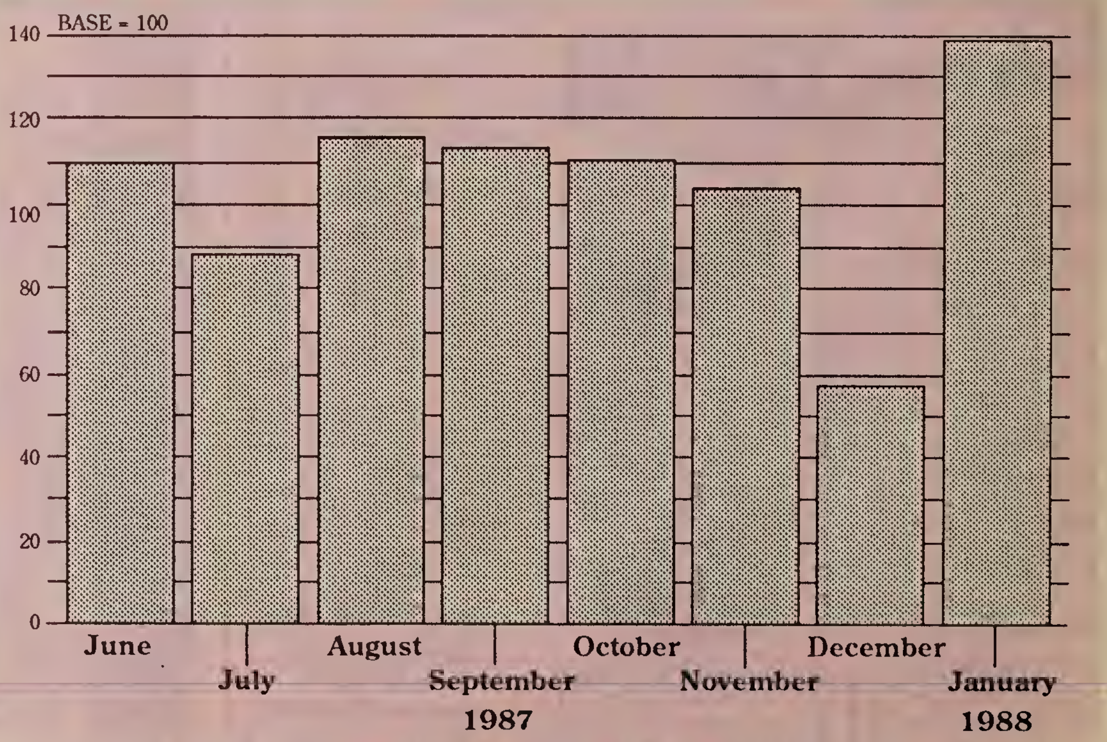
CAREER INDEX

Computer recruitment advertising index*



*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

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(position is exempt under Merrit System Rules)

Maricopa County, a governmental subdivision encompassing the Phoenix area and its 1.9 million residents, is seeking a project manager for the renovation of its Criminal Justice computer system. This system will provide EDP for the Sheriffs Office, County Attorney Office, and the Adult Probational department, and will interface with computer systems supporting the courts and other justice agencies. Project duration: 2 to 5 years.

The Project Manager must have strong knowledge of project management, computer hardware, software, 4GL's, and database system, good communication skills, and ability to coordinate project activities with county officials and project team members.

Required is a Bachelor's degree in computer science, business administration, or related fields, and 5 years progressive responsibility in project management. Must have 2 years experience in Criminal Justice Systems in coordinating multi-agency projects.

To request application materials, submit resume to: The Maricopa County Personnel Department, Recruiting and Selection Division, 111 South Third Ave., Phoenix, AZ 85003. Attention: LEJIS PROJECT, or call (602) 262-3755, by March 25, 1988.

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Big Blue's gray market ethics

IBM unofficially declares end of A T Model 339 production

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

The secondary market experienced steady trading during the first week of the month, with IBM Personal Computer AT Model 339s, Hewlett-Packard Co. Laserjets and Apple Computer, Inc. Imagewriters dominating the Big Board.

The recurring issues of industry ethics seem to have had little effect on end users' purchasing decisions.

The picture was rather gray for IBM throughout the week. At the same time the company was busy mandating "prestigious locations," face-to-face transactions and authorized sales offices for legitimate dealers, an IBM division called the Boston Computer Exchange in search of 300 new PC AT Model 399s.

When the broker informed the IBM representative that the transaction was an impossibility because, in his words, "that's a gray market," the IBM employee clarified his request by saying, "I'll take them new or used."

End of the line?

Now that we have received an unofficial confirmation of the end of AT Model 339 production, it is time to ask why IBM, an experienced buyer, had no problem trying to consummate a purchase over the phone with an unauthorized source.

Ironically, the Model 339 closed down in used trading during the week, as rumors of large quantities about to be dumped on the market soured dealers' expectations. The highly desired model fell $50, to $3,350. In contrast, the PC AT Model 099 closed even, at $2,350, as steady demand by end users flavored trading.

> THE MACHINE that brought transportable computing to users' minds — and Compaq into the money — continues to trade as a standard commodity.

IBM PC XT trading volume picked up during the week ending March 4, as supply conditions improved. The XT Model 089 held steady at $1,750, while the XT Model 086 dropped marginally, closing at $1,300. The 256K-byte PC Model 076 closed even at $825, experiencing solid conditions.

Business as usual

In comparison, things were quiet on the Compaq Computer Corp. front. The first week of March produced nothing but business as usual for end users and dealers alike. Compaq's luggable Portable I closed even at $800. The machine that brought transportable computing to users' minds — and Compaq into the money — continues to trade as a standard commodity.

Later Compaq Portable models did not fare as well, illustrating the growing market force of truly portable machines. The Portable II closed down, at $1,575, while the Portable III "lunch box" brought a price of $2,750.

Compaq's Deskpro models performed well all week. The Deskpro 286, complete with a monochrome monitor and a 20M-byte hard drive, closed up, at $2,350.

Used Deskpro 386 models continue to be in short supply, and the 40M-byte, 16-MHz model closed at $4,275 during the week ending March 4.

Apple Macintosh users were out in full force looking for deals all week. A large number of savvy buyers, coupled with steady supply conditions, made for a consistent market.

The BoCoEx Index

Closing prices report for the week ending March 4, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$825	$900	$600
XT Model 086	$1,300	$1,425	$800
XT Model 089	$1,750	$1,875	$1,000
AT Model 099	$2,350	$2,425	$1,950
AT Model 339	$3,350	$3,600	$2,400
Compaq Portable I	$800	$925	$650
Portable II	$1,575	$1,900	$1,475
Portable III	$2,750	$3,000	$2,175
Plus	$1,350	$1,400	$975
Deskpro 286	$2,350	$2,475	$2,050
Deskpro 386	$4,275	$4,575	$3,600
Apple Macintosh 512	$825	$900	$650
512E	$975	$1,075	$800
Plus	$1,250	$1,350	$950
SE	$1,850	$2,100	$1,600
II	$4,000	$4,200	$3,500
DEC Rainbow 100+	$750	$900	$600
Hewlett-Packard Laserjet	$875	$1,000	$550
Toshiba T1100+	$1,100	$1,200	$900

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Warning not heeded

Sales of new Macintosh units continue to be heavily discounted, holding used prices even. Announcements of harsh punishment for gray market activities by the manufacturer seem to have had little or no effect on the gray market to date.

The state-of-the-art Macintosh II held its value of $4,000, while the Mac SE closed down $25, at $1,850. The Macintosh Plus closed even, at $1,250, despite a slight decrease in trading volume. The Macintosh 512E and Mac 512 traded even, at $975 and $825, respectively.

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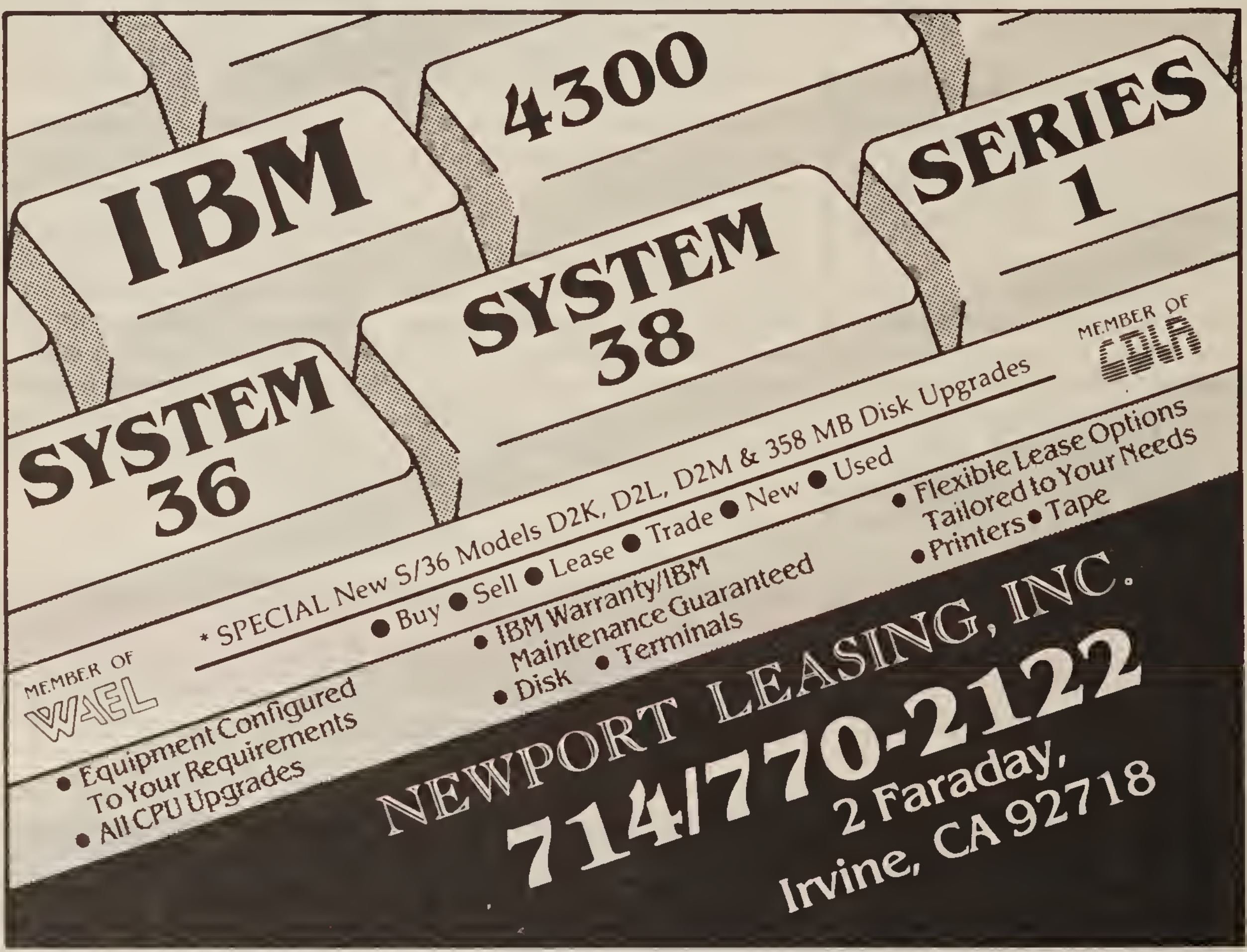

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Training

Dual role in training managers

BY ARVIND SHAH
and LEILANI ALLEN
SPECIAL TO CW

Often seen as a training facility for clerical or professional end users, the information center should also play a significant role in educating management in topics beyond the traditional areas.

But to do so, management training sessions must be particularly well planned to accomplish twin objectives: educating management and selling the value of the information center at the same time.

The success of the center depends on management commitment. Managers must be aware of the center's mission, objectives and functions. Managers at all levels must understand and support center policies, standards and procedures, especially those governing the selection and acquisition of hardware and software.

At the same time, managers must be trained in the use of technology. The type of training depends upon how extensively the managers will be using personal computers or terminals.

Selecting the appropriate method of training can determine the success of the effort. One-on-one tutorials are especially good because managers usually are reluctant to attend formal courses that make heavy demands upon their time. Managers also tend to ask a lot of questions that a "canned" training course cannot handle. They also do not like being in sessions with their subordinates.

To avoid encountering their staffs in training sessions that deal with basic skills, some mangers prefer attending off-site sessions with their peers from other companies. These sessions are often presented by the internal information center staff.

Scheduling off-site training for executives from different companies should not be viewed as detrimental to the internal information center. Instead, the training can be seen as an opportunity to make more use of existing resources and enhance the reputation of the center's staff.

Besides introducing managers to the standard subjects of application selection and PC use, the training should include, preferably at the end, an overview of what the information center is all about and identify it as the source for future help. This session should be delivered by the information center staff.

The orientation should sell managers on why standards are necessary, rather than simply telling them the requirements. Managers should be told if they will eventually be charged for center services.

The orientation should not be an intense event. Refreshments might be served to give managers a good feeling about the information center.

Instead of being delivered in massive manuals or rulebooks, key information should be compressed into a one to two-page brochure. This publication can contain the hours of operation, a brief description of the products available, a diagram of the facility and the procedures for requesting services. To emphasize the entrepreneurial nature of this function, the staff might hand out business cards with their particular responsibilities clearly defined.

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ADVERTISERS INDEX

ADR 3
AI Corp. 22
AT&T 72-73
BMC Software SC3
Businessland 46-47
Capital Communications 32
CFS-Desco, Inc. 26
Cincom Systems SC4
Codex 37
Cognos SC2
Compuserv S3,S5,S7
Computer Associates 36
Computer Horizons S15
Computer Technology 76
Control Data Corp. 60
Corporate Software 14-15
CW Button 55
CW Customer Service 75
CW Marketplace 82
Data Design Associates C4
Data General Corp. 61
Data Group 54
Dataserv 65
Dexpo South 78
Digital Consulting S8/S9
Digital Equipment Corp. 58-59
Epson America 30-31
Fischer International 25
Genesys Software 71
Goal Systems 44
Hewlett Packard 39,41,43
Hughes Aircraft Company 32
IBM 62-63
Imperial Technology S14
Information Builders 18
Informix Software Inc. S6
Innovation Data Processing 7
Integral Systems 16
Interface Systems 57
KMW Systems 52
Lawson Associates 48
Litton Computer Services S4
May & Speh 81
Micro Focus 33
Mitron Systems 23
NEC 34
NETEC 70
New Age Consulting S13
Nixdorf Computer 64-65
On-Line Software 11,17,19
Oracle 9
PC Expo 74-75
Prime Computer 49
Progress Software 68
Rabbit Software 28-29
Radio Shack 53
Realia 56
Relational Technology 24
SAS Institute 12,13,27
Schumann Consulting S2
Siemens 50-51
Sorbus C3
Spectrum Technology 54
SQ Software 15
Syncsort 5
3 Com 66-67
Tone Software S13
Trimar Software S16
Wiley, John & Sons S7
Wyse Technology 77
X/Open 80

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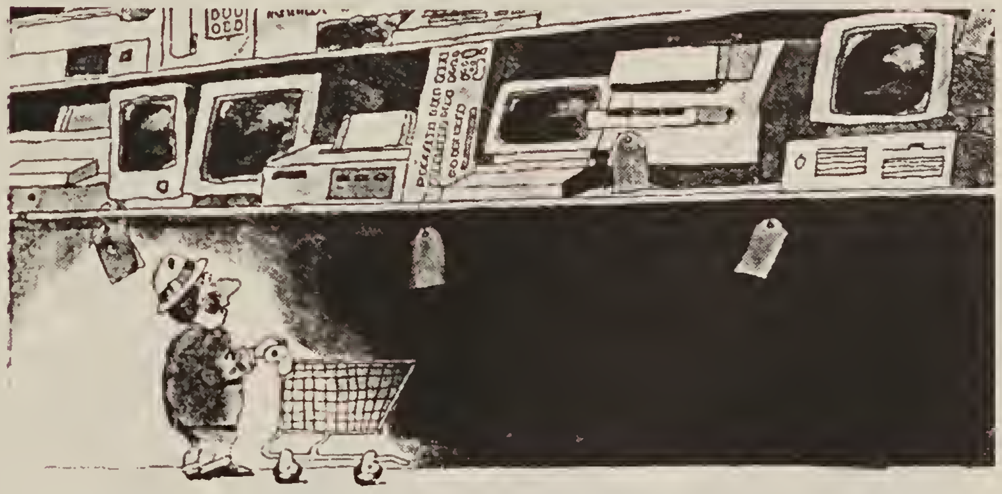
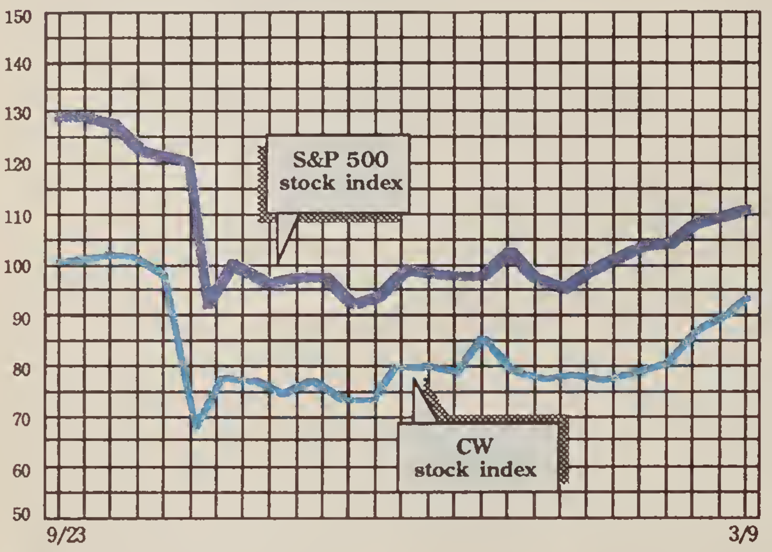


Upcoming Computerworld Spotlight Sections

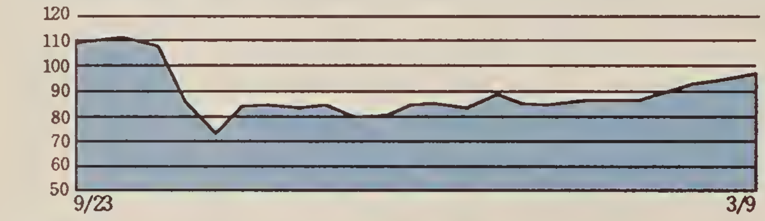
Issue Date	Topic	Ad Closing Date
April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	Electronic Publishing	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8
Aug. 8	TBA	July 22
Aug. 29	DB2 Market	Aug. 12
Sept. 19	Hardware Roundup: Large, Medium Scale and Special Purpose Systems	Sept. 2
Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9
Oct. 3	Hardware Roundup: Personal Computers and Workstations	Sept. 16
Oct. 17	AI/Expert Systems	Sept. 30
Oct. 31	Unix	Oct. 14

STOCK TRADING INDEX

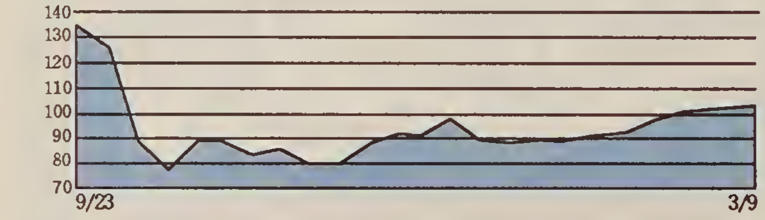


Indexes	*Last Week*	*This Week*
Communications	95.8	**97.8**
Computer Systems	101.4	**103.9**
Software & DP Services	101.6	**107.4**
Semiconductors	64.0	**68.3**
Peripherals & Subsystems	87.3	**93.2**
Leasing Companies	121.9	**128.1**
Composite Index	90.2	**94.5**
S&P 500 Index	110.8	**111.2**

Communications



Computer Systems



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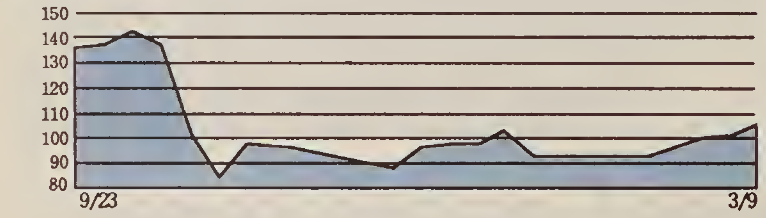
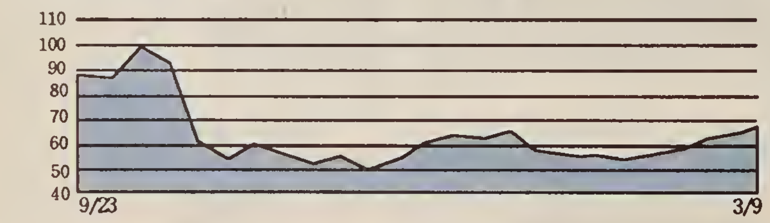
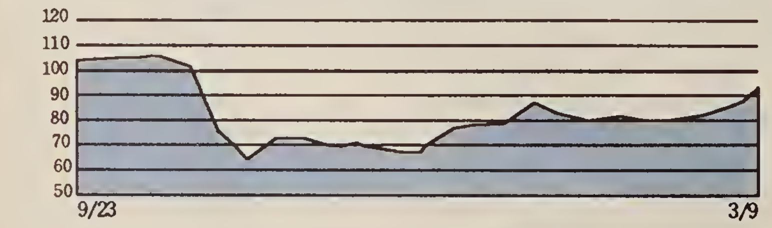


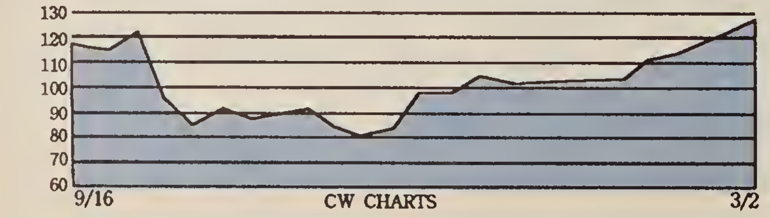
Semiconductors



Peripherals and Subsystems



Leasing Companies



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 9, 1988

Communications and Network Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 9 1988	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	100	74	91.25	-3.4	-3.6
Q	ANDREW CORP	19	11	15.25	0.0	0.0
Q	ARTEL COMM CORP	4	2	1.75	-0.1	-3.5
N	AT&T	36	20	28.50	-0.9	-3.0
Q	AVANT GARDE COMP INC	6	2	1.88	-0.1	-3.3
Q	AVANTEK INC	18	6	B.00	0.B	10.3
N	AYDIN CORP	38	16	22.38	-0.3	-1.1
N	BELL ATLANTIC CORP	B0	61	68.88	-3.1	-4.3
N	BELLSOUTH CORP	44	29	39.13	-1.6	-4.0
Q	COMPRESSION LABS INC	7	2	3.13	0.0	0.0
O	COMPUTER NETWORK TECH	6	2	1.69	0.0	0.0
O	CONTEL CORP	40	25	34.50	0.4	1.1
Q	DATA SWITCH CORP	9	4	B.38	0.6	8.1
Q	DIGITAL COMM ASSOC	49	20	35.38	3.3	10.1
Q	DYNATECH CORP	42	14	22.00	0.5	2.3
Q	FIBRONICS INTERNATIONAL INC	10	2	4.25	0.3	6.3
Q	GANDALF TECHNOLOGIES	11	5	7.25	0.8	11.5
Q	GENERAL OATACOMM INDS	14	3	4.38	0.5	12.9
N	GTE CORP	45	29	38.13	-0.B	-1.9
Q	INFOTRON SYS CORP	12	5	9.00	0.B	9.1
N	ITT CORP	66	42	46.88	-1.5	-3.1
N	M A COM INC	16	7	10.13	-0.4	-3.6
Q	MCI COMMUNICATIONS CORP	12	6	11.13	-0.3	-2.2
Q	MICOM SYS INC	17	7	12.50	1.1	9.9
Q	NETWORK SYS CORP	18	7	9.75	0.6	6.8
N	NORTHERN TELECOM LTO	24	14	19.63	0.5	2.6
Q	NOVELL INC	30	12	22.25	2.4	11.9
N	NYNEX CORP	78	58	67.00	-3.4	-4.8
N	PACIFIC TELESIS GROUP	34	9	28.25	-0.5	-1.7
N	PARAOYNE CORP	9	4	5.50	-0.4	-6.4
A	PENRIL CORP	6	1	4.25	0.0	0.0
N	PLESSEY PLC	41	23	31.00	0.0	0.0
N	SCIENTIFIC ATLANTA INC	20	8	15.00	1.0	7.1
N	SOUTHWESTERN BELL CORP	46	22	36.88	-1.1	-3.0
Q	3 COM CORP	26	12	23.38	2.4	11.3
N	TIMEPLEX INC	41	17	32.25	0.0	0.0
Q	UNGERMANN BASS INC	16	5	12.25	0.0	0.0
N	U S WEST INC	60	43	53.88	-1.3	-2.3

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 9 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	5	8.25	1.3	17.9
Q	ALPHA MICROSYSTEMS	6	3	4.25	0.1	3.0
Q	ALTOS COMPUTER SYS	16	9	12.25	0.8	6.5
A	AMDAHL CORP	50	19	36.38	2.0	5.8
Q	APOLLO COMPUTER INC	25	9	16.25	0.0	0.0
Q	APPLE COMPUTER INC	60	28	46.75	2.0	4.5
N	BOLT BERANEK & NEWMAN	28	12	15.00	-0.3	-1.6
Q	BRITTON LEE INC	5	1	2.13	0.6	36.0
N	COMPAQ COMPUTER CORP	79	26	55.13	4.8	9.4
Q	COMPUTER AUTOMATION INC	17	5	12.50	-0.4	-2.9
A	COMPUTER CONSOLES INC	11	2	5.00	-0.1	-2.4
Q	CONCURRENT COMP CORP	24	11	17.25	-0.8	-4.2
N	CONTROL OATA CORP OEL	38	18	28.00	1.9	7.2
Q	CONVERGENT TECH	11	3	4.06	0.4	12.1
Q	CONVEX COMPUTER CORP	22	6	10.00	1.4	15.9
N	CRAY RESH INC	136	47	86.38	1.5	1.8
Q	OAISY SYS CORP	12	5	8.88	1.4	18.3
N	OATA GEN CORP	37	16	26.50	-0.8	-2.8
N	OATAPOINT CORP	9	3	4.00	-0.1	-3.0
N	OIGITAL EQUIP CORP	200	110	120.50	0.3	0.2
N	FLOATING POINT SYS INC	15	3	4.38	0.1	2.9
N	GOULD INC	34	8	13.00	0.9	7.2
N	HARRIS CORP	43	22	29.00	-0.8	-2.5
N	HEWLETT PACKARO CO	74	36	64.50	-0.1	-0.2
N	HONEYWELL INC	91	49	66.38	1.4	2.1
N	IBM	176	102	116.63	-0.6	-0.5
Q	INFORMATION INTL INC	17	9	12.50	-0.5	-3.8
Q	IPL SYS INC	3	1	1.88	-0.6	-25.0
Q	MASS COMPUTER CORP	14	5	5.25	-1.5	-22.2
N	MATSUSHITA ELEC INOL LTO	201	93	200.75	13.6	7.3
Q	MEGAOATA CORP	6	3	3.63	0.0	0.0
Q	MENTOR GRAPHICS CORP	39	14	28.00	0.3	0.9
N	N8I INC	14	4	6.38	0.0	0.0
N	NCR CORP	B7	50	65.88	1.9	2.9
N	PRIME COMPUTER INC	31	12	17.38	-1.3	-6.7
Q	PYRAMIO TECHNOLOGY	12	5	11.13	0.6	6.0
Q	STRATUS COMPUTER	41	15	28.00	1.0	3.7
Q	SUN MICROSYSTEM INC	46	14	35.00	1.3	3.7
Q	SYMBOLICS INC	6	1	1.38	-0.2	-10.2
N	TANOEM COMPUTERS INC	38	17	22.13	1.4	6.6
N	TANOY CORP	57	28	40.25	-0.4	-0.9
N	ULTIMATE CORP	37	13	15.38	0.6	4.2
N	UNISYS CORP	48	24	36.50	-0.4	-1.0
A	WANG LABS INC	19	10	16.38	1.5	10.1

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 9 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Q	AOVANCEO COMP TECH	6	1	2.00	-0.1	-5.9
N	AGS COMPUTERS INC	30	11	17.50	0.3	1.4
Q	AMERICAN MGMT SYS INC	20	9	17.25	0.4	2.2
Q	AMERICAN SOFTWARE INC	22	6	13.75	1.8	14.6
N	ANACOMP INC	11	4	9.00	1.3	16.1
Q	ANALYSTS INTL CORP	10	4	7.50	0.3	3.4
Q	ASHTON TATE	33	13	30.00	1.5	5.3
Q	ASK COMPUTER SYS INC	16	6	14.75	2.5	20.4
Q	AUTODESK INC	34	12	25.25	2.3	9.8
N	AUTO DATA PROCESSING	55	16	47.00	1.0	2.2
Q	BOOLE & BA8BAGE INC	12	5	8.00	-0.3	-3.0
N	COMPUTER ASSOC INTL INC	37	15	31.75	2.6	9.0
Q	COMPUTER HORIZONS CORP	15	7	9.88	0.4	3.9
N	COMPUTER SCIENCES CORP	73	42	50.75	-0.4	-0.7
N	COMPUTER TASK GROUP INC	17	9	11.00	1.0	10.0
Q	COMSHARE INC	28	12	18.00	3.5	24.1
N	CULLINET SOFTWARE INC	14	4	8.00	2.0	33.3
Q	CYCARE SYS INC	10	6	7.88	0.0	0.0
Q	DUQUESNE SYS INC	33	10	20.75	1.0	5.1
A	DATA ARCHITECTS INC	17	7	13.63	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	43.63	1.9	4.5
Q	HOGAN SYS INC	17	5	5.88	0.9	17.5
Q	INFORMIX CORP	31	12	20.25	0.3	1.3
Q	INTELLICORP INC	11	2	3.63	0.8	26.1
Q	KEANE INC	10	6	8.00	0.5	6.7
Q	LOTUS OEV CORP	40	19	32.75	2.3	7.4
Q	MANAGEMENT SCI AMER	20	6	7.38	-0.1	-1.7
Q	MICRO PRO INTL CORP	8	3	3.63	-0.1	-3.3
Q	MICROSOFT CORP	79	37	64.00	4.5	7.6
Q	MORINO ASSOCIATES INC	24	7	16	0.6	4.0
Q	NATIONAL OATA CORP	34	19	27.25	0.8	2.8
Q	ON LINE SOFTWARE INTL INC	22	9	12.75	1.5	13.3
Q	ORACLE SYS CORP	19	8	16.75	1.8	11.7
N	PANSOPHIC SYS INC	28	11	18.13	2.4	15.1
Q	POLICY MGMT SYS CORP	30	15	25.50	2.0	8.5
Q	PROGRAMMING & SYS INC	14	7	12.25	-0.5	-3.9
Q	REYNOLOS & REYNOLOS CO	39	14	22.50	1.3	5.9
Q	SEI CORP	18	10	16.38	-0.1	-0.8
Q	SHAREO MEO SYS CORP	37	19	25.25	-0.4	-1.5
Q	SOFTWARE AG SYSTEMS INC	15	7	11.25	-1.5	-11.8
Q	SOFTWARE PUBG CORP	17	5	14.00	0.5	3.7
A	STERLING SOFTWARE INC	14	6	8.38	0.0	0.0
Q	SUNGARD DATA SYS INC	21	10	16.75	-0.3	-1.5
Q	SYSTEMATICS INC	30	19	27.50	0.0	0.0
N	SYS. SOFT INC.	24	7	16	0.8	4.8
Q	VM SOFTWARE INC	45	7	12.13	0.1	1.0

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 9 1988	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO OEVICES INC	25	8	13.25	0.9	7.1
N	ANALOG DEVICES INC	24	B	14.75	1.4	10.3
Q	ANALOGIC CORP	13	5	7.25	0.3	3.6
Q	INTEL CORP	42	18	31.63	2.6	9.1
Q	LSI LOGIC CORP	17	7	10.75	1.0	10.3
N	MOTOROLA INC	74	35	51.00	2.5	5.2
N	NATL SEMICONOUCTOR	22	10	12.38	0.3	2.1
N	TEXAS INSTRS INC	80	36	55.00	0.9	1.6
A	WESTERN OIGITAL CORP	33	11	15.50	0.6	4.2

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 9 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLOY COMP.	13	3	5.00	1.4	37.9
N	AM INTL INC	9	3	4.00	-0.1	-3.0
Q	AST RESH INC	21	6	10.88	1.1	11.5
Q	AUTO TROL TECH CORP	9	3	5.75	0.5	9.5
Q	BANCTEC INC	16	5	7.75	-0.1	-1.6
Q	CIPHER DATA PROOS INC	16	4	8.88	0.6	7.6
A	COGNITRONICS CORP	5	2	3.13	0.3	B.7
N	COMPUGRAPHIC CORP	28	19	23.25	1.0	4.5
N	COMPUTERVISION CORP	21	7	7.00	0.0	0.0
A	DATAPROOUCTS CORP	24	7	9.50	0.6	7.0
A	OATARAM CORP	9	5	6.25	0.0	0.0
N	OECISION INOS CORP	13	4	10.75	0.1	1.2
N	EASTMAN KODAK CO	71	40	42.88	-1.1	-2.6
Q	E M C CORP MASS	29	10	18.38	3.6	24.6
Q	EMULEX CORP	9	4	8.00	0.3	3.2
Q	EVANS & SUTHERLANO	40	1B	21.25	1.3	6.3
Q	ICOT CORP	13	3	5.25	0.3	5.0
Q	INTERLEAF INC	24	10	19.50	1.9	10.6
Q	IOMEGA CORP	6	1	2.88	-0.1	-2.1
Q	LEE OATA CORP	9	3	3.75	-0.1	-3.2
Q	MASSTOR SYS CORP	6	1	2.13	0.1	3.0
Q	MAXTOR CORP	33	6	15.00	1.6	12.1
Q	MICROPOLIS CORP	44	13	29.13	1.4	5.0
Q	MINISCRI8E CORP	18	5	11.75	1.8	17.5
N	MINNESOTA MNG & MFG CO	84	45	58.38	-0.9	-1.5
A	MSI OATA CORP	29	12	28.13	3.4	13.6
Q	PRIAM CORP	6	1	2.50	0.2	8.1
Q	PRINTRONIX INC	13	7	9.63	0.9	10.0
N	QMS INC	27	8	11.50	2.1	22.7
Q	QUANTUM CORP	33	8	11.75	0.8	6.8
Q	RAMTEK CORP	6	2	4.00	-0.1	-3.0
N	RECOGNITION EQUIP INC	24	7	9.63	0.1	1.3
Q	REXON INC	14	5	8.38	1.4	19.6
Q	SCAN TRON CORP	14	7	12.25	2.0	19.5
Q	SEAGATE TECHNOLOGY	46	10	21.63	2.0	10.2
N	STORAGE TECH CORP	5	1	1.88	0.1	7.1
Q	TANOON CORP	7	1	1.88	0.3	20.0
A	TEC INC	7	3	4.50	-0.1	-2.7
N	TEKTRONIX INC	41	21	28.75	3.3	12.7
Q	TELEVIOEO SYS INC	3	1	1.25	-0.1	-4.8
N	TELEX CORP	94	30	51.00	0.0	0.0
Q	WYSE TECH	40	11	22.63	2.1	10.4
N	XEROX CORP	85	50	58.38	-3.4	-5.5
Q	XIOEX CORP	16	6	8.38	1.5	21.8

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 9 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Q	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	5.75	0.0	0.0
N	COMOISCO INC	37	12	23.75	1.0	4.4
N	CONTINENTAL INFO SYS	14	5	9.00	0.9	10.8
Q	PHOENIX AMERN INC	6	2	3.25	0.4	13.0
Q	SELECTERM INC	6	3	4.00	-0.1	-3.0

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL;
O = OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE BIO PRICES AS OF 3 P.M. OR LAST 8IO
(1) TO NEAREST DOLLAR

Seeing red

Wang, DEC among wounded as bulls turn tail and retreat

After hitting a postcrash high of 2,081.07 on Tuesday, the Dow Jones industrial average's bull market suddenly turned and gored computer issues last week. Chief among the wounded as of Thursday's close were Wang Laboratories, Inc. and Digital Equipment Corp., which both announced that third-quarter financial results would not meet expectations.

Wang's stock took a beating late Thursday on the American Stock Exchange and fell 2⅞ points for the four days of trading to finish at 12⅞. DEC's announcement on Tuesday negated its upswing of a week earlier, as it lost four points for the day and dropped 1⅝ points for the week to land at 120.

Other vendors who fell included IBM, down 3⅛ points to 113¾; Apple Computer, Inc., slipping 1⅝ points to 45¼; Unisys Corp., down 1½ points to 34⅞; and Hewlett-Packard Co., down 1½ points to 62.

The few bright spots on the Street included Microsoft Corp., which was up 2 points to 62¾; Amdahl Corp., up 1¼ points to 35¾; and Compaq Computer Corp., which rose strongly on Monday and finished up 1⅛ points at 53⅛.

JAMES DALY

Planning begins for super workstation use

BY NELL MARGOLIS
CW STAFF

Months before any mega-MIPS can be delivered to their desk tops, two representative target users voiced enthusiastic interest in Apollo Computer, Inc.'s newly announced 64-bit reduced instruction set computing-based Domain Series 10000 Personal Supercomputer.

Ben Ford, computer-aided design (CAD) systems coordinator at Schwinn Bicycle Co. in Chicago, is already involved in the high-intensity simulation tasks that, according to Apollo, will be made possible and even affordable for the workstation user when the Domain Series 10000 rolls out later this year.

Gus Cinordo, staff engineering manager at the Tarrytown, N.Y.-based central engineering department of General Foods USA, anticipates expansion into such uses.

The Domain 10000's promised three-dimensional graphics component is not scheduled to be announced until the second half of this year, and the box itself is only on the eve of being beta tested. But neither fact fazes Ford.

"We ordered our DN590, which was a very expensive machine for us, before we saw it — in fact, before it was available," he said. Apollo beat its stated shipment date by a month, Ford said, "and everything worked."

'Definitely looking'

"We're just getting into finite element analysis, so we're definitely looking" at the 60 million to 100 million instructions per second that the Domain Series 10000 is promising, Ford said. His department has 12 Apollo workstations for CAD/computer-aided manufacturing use.

Finite element analysis, Ford said, "creates a huge matrix to be solved. A bike frame model, for instance, could easily have 8,000 elements, with about six degrees of freedom — the amount by which a load could shift — per element. That means you're solving for 54,000 degrees of freedom."

If this is what it takes to model bicycle frames, Ford said, "just picture what they're doing for cars or planes."

General Foods' Cinordo said his company does not currently need the Domain 10000's speed. Planned advances into real-time simulation and robotics, however, could make the new product "a real possibility."

Even if General Foods never buys a supercomputer workstation, Cinordo said, the company will benefit from the market niche now being created by the likes of Apollo, Ardent Computer Corp. and Stellar Computer, Inc.

"All these breakthroughs, offering so much more processing power, are driving down prices at the lower end of the workstation market, where our present interest lies," Cinordo said. "If you grow . . . you'll need the machines. If you don't, you'll need their effect on the market."

Lotus

FROM PAGE 1

has some explaining to do.

"They've left a lot of questions in the air," said Thomas White, president of Infonetics, Inc., a Santa Clara, Calif.-based consulting firm.

Many of those questions may be answered by Lotus tool kits that allow Lotus, third-party vendors and MIS shops to write so-called data base drivers that take advantage of the common data-access interface. If Lotus garners broad support for the interface, strategic products such as Lotus/DBMS will support the bulk of non-Lotus data base management systems.

No rewrites needed

Furthermore, because other Lotus applications, such as Lotus/DBMS, 1-2-3/G and 1-2-3/M, will also include this interface, these drivers do not have to be rewritten to work with future Lotus packages, one source said.

The announcement will also include a description of The Application Connection (TAC) 5.0, a new version of TAC offering tighter integration to Lotus spreadsheets through the new data interface. TAC 5.0 will also provide access to hosts other than the IBM 370 and support a broader range of host applications. Lotus, however, will not formally announce TAC 5.0, one source said.

TAC converts data from host to PC formats, allowing users to access host data using a familiar PC interface. TAC, an information center-oriented product, currently works with applications such as IBM's DB2 and Information Builders, Inc.'s Focus.

TAC 5.0, an upgrade provided free of charge to current users, is also a cornerstone of the firm's DBMS communications strategy, particularly in regard to DB2.

"TAC is an important component in our ability to retrieve mainframe data for users working with Lotus/DBMS," said Tom Smaldone, director of product marketing for Lotus's advanced products division, in a previous interview.

With TAC's support of the common data-access interface, existing customers will be able to use it to provide data to Lotus's upcoming products, such as Lotus/DBMS and 1-2-3/G for Microsoft Corp.'s OS/2 Presentation Manager, according to a source briefed by Lotus.

Lotus is also expected to preview communications software that works with TAC to provide the actual data transport. Currently, TAC relies on a customer's existing communications hardware and software.

"The missing piece is still the transport piece, the actual communications software and communications management capability," said another source at a major host software firm.

Lotus is expected to provide further details on how the unshipped Lotus Extended Application Facility (LEAF) language will help tie all of its applications, including Lotus/DBMS, together. "LEAF enables developers to write cross-product applications that link products and exchange live data," Smaldone explained.

So far, Lotus has made little headway in pushing its communications message, a situation that may change as its newer products begin to ship.

For example, the company has been close-mouthed about the actual number of TAC installations. But although sales are believed to be sluggish, the firm considers TAC to be an increasingly strategic product, observers said.

TAC users contacted by *Computerworld* have generally been pleased with the technology. "We used it for a specific need and then expanded it. It was totally effective," said James V. McDonnell, vice-president at The Equitable Assurance Co. in New York. Because of a change in hardware, The Equitable is no longer using TAC.

Tech glitches fixed?

TAC also had some technical problems early on. However, these have been largely resolved, and the product may have a bright future, one large user said, who asked not to be identified.

But some large firms continue to reject TAC for the same reason they have rejected all generic micro-to-mainframe data exchange products.

"Nothing off the shelf will serve their needs," said Larry Rafsky, president of Gari Software, Inc., a Roseland, N.J.-based micro-to-mainframe consultancy. "Users need special security, special modems and a lot of special-purpose code. Lotus has to be willing to go in and customize," Rafsky said.

Cobol 85 compilers with discrepancies

Failed to compile one or more tests in the validation suite

Vendor	Compiler	Level	Hardware
DEC	VAX Cobol 4.0	High	DEC VAX series
IBM	VS Cobol II	High	IBM MVS/370
NCR	VCobol 85	High	NCR 8500 to 9800 series

INFORMATION PROVIDED BY THE NATIONAL BUREAU OF STANDARDS CERTIFIED COMPILER LIST
CW CHART

Checklist on Cobol 85 tests

BY CHARLES BABCOCK
CW STAFF

GAITHERSBURG, Md. — Thirteen Cobol 85 compilers have thus far been certified as meeting Federal Information Processing Standards for users of minicomputer, superminicomputer or mainframe systems, according to the National Bureau of Standards' Certified Compiler List for January.

An additional six Cobol 85 compilers have been validated for IBM's Personal Computer, Personal System/2 and compatibles.

The bureau also listed three compilers that failed one or more provisions of the validation suite of tests and must pass all provisions when they are retested a year after their initial review. The compilers, however, passed a sufficient number of tests to be placed on the validation list. Failure to pass all tests on the second try will result in decertification, spokesmen for the NBS said.

The list is drawn up to advise federal agencies of vendors that have compilers meeting American National Standards Institute standards for Basic, Fortran, Ada, Pascal and Cobol. Vendors must appear on the list or be scheduled to be tested for validation in order to bid on federal contracts requiring one of these languages.

Compilers may be tested for three different levels of validation: low, intermediate or high. The suite of tests grows progressively stringent from the low to high levels.

Copies of the list may be obtained by writing to the Institute for Computer Sciences and Technology at Building 225, Room A266, Gaithersburg, Md.

Micro, mini, mainframe Cobol 85 compilers

Approved by the National Bureau of Standards with no discrepancies

Vendor	Compiler	Level	Hardware
CDC	Cobol/VE Version 1.5	High	CDC Cyber 180s
Hewlett-Packard	Cobol II/XL	Intermediate	HP 3000/XL Series 930
	Cobol II/3000	Intermediate	HP 3000 Series 68
Honeywell Bull	Cobol-85	High	Honeywell Bull DPS 8/90
	Cobol M	High	Honeywell Bull DPS 6
IBM	Cobol/2	Intermediate	IBM Personal System/2
Mbp Software & Systems Gmbh	Mbp Cobol 85	Intermediate	IBM PC AT
Language Processors	LPI-Cobol	High	Sun-3/280
Micro Focus	VS Cobol Workbench	Intermediate	IBM PC XT, PS/2
	VS Cobol 286	Intermediate	IBM PC AT
	VS Cobol 1.5	Intermediate	AT&T 3B2 400
	Micro Focus Cobol/2 1.0	High	IBM PS/2
	Micro Focus Cobol/2 X1.0	High	AT&T 3B2
Prime Computer	Cobol 85	Intermediate	Prime 50 series
Ryan-McFarland	RM/Cobol-85	Intermediate	Altos 2000, NCR Tower
	RM/Cobol-85 3.0	High	IBM PC AT
Tandem Computers	Cobol85	High	Tandem Nonstop II
Unisys	Ucob 3R1	High	Unisys 1100 series
Wang Laboratories	VS Cobol 85	Intermediate	Wang VS series

INFORMATION PROVIDED BY THE NATIONAL BUREAU OF STANDARDS CERTIFIED COMPILER LIST
CW CHART

Gone awry

FROM PAGE 1

with problems leading to long delays in taxpayer refunds [CW, April 15, 1985]. According to outside auditors, the problem occurred when the IRS mishandled a cutover to new mainframes and new Cobol software.

The mixup did, however, serve to highlight the fact that the IRS systems were mismanaged and outdated [CW, March 24, 1986].

- Beginning in 1983, Blue Cross/Blue Shield of Wisconsin attempted to convert its entire financial and claims systems. Though the company's MIS officials argue that the $600 million conversion, perhaps the largest of its kind, went off as intended, the local media in Milwaukee observed otherwise.

Blue Cross/Blue Shield contracted with Electronic Data Systems Corp. (EDS) to replace its entire DP environment, which had grown to an unwieldy mass of confusion. Seven different claims processing systems and three different membership systems were filled with old and outdated information.

After two years, EDS implemented the new system, but it caused serious problems for subscribers. Claims were either not paid at all or were overpaid to the tune of tens of millions of dollars. The company lost $28 million in 1985 and nearly as much in 1986.

Furthermore, Blue Cross/Blue Shield reportedly lost more than money: 22,000 subscribers have canceled their memberships since the 1985 implementation. Both Blue Cross/Blue Shield and EDS claim that the system is now up and working as expected.

Best of intentions

In the age of strategic advantage through the use of information systems, it follows that some strategies, implemented with the best of intentions, simply do not work.

According to Charles Wiseman, president of Competitive Applications, Inc., a New York consulting firm, and author of *Strategy and Computers*, MIS alone cannot be blamed for failed strategies.

Often, he says, the failures are not technological in nature but rather a failure to read a particular market or trend correctly. "When the nature of a business changes, cracks appear in the MIS strategy," Wiseman says. "Companies with open and flexible styles and good communications can lessen the impact of a change or new trend. They don't put the onus on one individual in MIS. Usually what is wrong is beyond the control of one person anyway."

It is clear, though, that MIS is becoming a major player in corporate direction. And as such, its strategies can play major, if not dominating, roles in the success or failure of a business.

Computerworld took a look at several MIS strategies that, for one reason or another, did not work. The rationale is simple: If you can learn from success, you can also learn from failure.

The label "failure" is actually too harsh in many cases; the success of these strategies typically depended, as Wiseman says, on many other corporate decisions besides MIS.

Kendall Co.

Kendall, a Boston-based hospital supplies manufacturer and subsidiary of Colgate-Palmolive Co., was in a state of change. Three years ago, Colgate-Palmolive decided that decentralizing was the road to the future and suggested its subsidiaries follow its lead. Since that time, Kendall did just that, breaking into seven autonomous business units.

But the MIS department was heading in the opposite direction. The then-MIS director, a centralist, believed strongly in mainframe-oriented, top-down control.

Kendall's MIS department continued to create massive centralized data bases using IBM's IMS and, later, Cullinet Software, Inc.'s IDMS data base management systems. Nearly $3 million was spent on IDMS applications in a two-year period.

Cipolla, *Kendall's director of MIS*

The MIS staff knew that this strategy was "flying in the face of reality in terms of where the company was going," says Ronald Cipolla, current corporate director of MIS. But the department could not persuade its boss that other options, such as departmental processors running manufacturing resource planning, could be implemented at one-fifth the cost.

Upper management started to question the MIS direction as well. "Are we doing the right thing?" was a frequently heard question, but no one insisted on an answer, Cipolla says.

"We were making adhesives, not building airplane engines," he says. "We just didn't need the functionality of IDMS."

Two years ago, the MIS director was recruited elsewhere, and Cipolla, a high-level MIS manager, took over. It wasn't hard for him to convince top management that the mainframe approach just did not provide the economies of scale required for the company. The centralist MIS strategy was brought to an immediate halt.

The out-of-pocket cost of stopping one strategy and starting another was nearly $6 million in terms of hardware, software and labor, plus the uncalculated cost in man-hours for new planning and retraining. The company also found itself two years behind where it might have been if it had originally embraced the decentralized environment.

Cipolla, however, says he believes the setback was minor compared with the potential disaster.

"The company decided to change its spots just about the time MIS realized it needed to change directions, so the timing was actually perfect," Cipolla says. "If Kendall had decided to decentralize five years ago, the situation now would be tragic."

The frustration, according to Cipolla, led to the departure of many good MIS people from Kendall. MIS's reputation also suffered; much time was spent mending fences.

Under Cipolla, Kendall now has MIS chiefs in each of its seven divisions. Each will run its own data center based on IBM's upcoming Silverlake, the promised follow-on to the System/36 and 38 minicomputers.

IBM Personal System/2s will be the workstation of choice. The company will essentially be devoid of mainframes. The entire network will be based on IBM's Systems Application Architecture as the developmental architecture.

Cipolla says he believes top management did not realize the impact MIS would have by implementing the corporatewide strategy.

"The major lesson we learned is that MIS strategy has got to be a premiere thought in the corporate strategy," he says. "That has been an evolutionary process at Kendall.

"When I joined the company, MIS was an afterthought, and it stayed that way until management started bringing MIS into the decision making process," he adds.

MIS was also at fault, Cipolla says. "We were enamored more with technical elegance than with how the system fit into our business. MIS activities have got to be a function of what the company does. It can't operate in a vacuum."

U.S. Department of Education

You might expect that a $19.6 billion organization would use its accounting systems to generate its year-end statement of financial condition. But at the Education Department in Washington, D.C., the general ledger system just isn't up to the job.

A December 1987 audit by the U.S. General Accounting Office identified the following problems with the agency's financial system:

- It cannot accept and record all relevant payroll expenses and liabilities, such as accumulated leave, from its subsidiary payroll accounting system.
- It fails to record information on receivables, such as collections, accrued interest and insurance premiums.
- It cannot accept much of the data from the department's $2.6 billion college housing loans program because of the incompatibility of the systems.

"Education's general ledger system . . . contains unreliable data because of inadequate and inefficient computer systems that support the general ledger and subsidiary accounting systems," the GAO reported.

The situation was so bad that agency officials had to rely on estimates and other records to prepare the annual financial report to the U.S. Department of the Treasury. "Education officials told us that none of the information in [the agency's] statement of financial condition is drawn from the general ledger," the auditors said.

Scrambled since 1979

Ronald C. Oleyar, director of financial management at the Education Department, says the accounting data has been scrambled ever since the agency was split from the former U.S. Department of Health, Education and Welfare in 1979.

The agency has little control over the general ledger system because it is leased from a small, outside contractor, Oleyar adds. But that policy will change this year, when the department buys a new general ledger that meets government accounting standards and can generate financial statements, he says.

The GAO's audit portrayed the ledger problem as part of a general breakdown in financial management systems at the agency.

"Overall, the Department of Education's accounting system does not provide managers with the reliable information they need to protect financial resources from fraud, waste and mismanagement and to satisfy internal and external financial reporting requirements," the audit concluded.

The GAO cites a lack of top management attention and the failure to conduct a follow-through to fix problems that the agency has known about since at least 1984.

For example, while a long-overdue study on upgrading the accounting systems was bumped from the fiscal 1986 budget, the agency was able to find funds for a study on "a universal postsecondary course classification system," the audit noted.

Wang Laboratories, Inc.

Wang has long suffered a reputation for a chaotic order processing and billing system. Customers would wait months for orders to be delivered and invoices to be processed. Repeated attempts by Wang to solve the problems internally failed.

In 1980, in the midst of 40% growth, Wang contracted with a small, independent consulting firm, Computer Partners, Inc. in Wellesley, Mass., to tackle its problem. The joint project with Wang's internal MIS department focused on automating revenue tracking from the time an order is placed to the time an invoice is collected.

The project was scheduled to be completed in 18 months. Three years later, with a drastically overextended budget and no end to the problems in sight, Computer Partners was dismissed. While Wang will not release figures, a former Computer Partners consultant estimates that at the time of its dismissal, the project was costing $10 million per year.

The consultancy had delivered five of the seven major phases of the plan, including a corporate data base and a corporate accounts receivables system, but two key pieces were never finished. According to Brad Sweet, Wang's director of computer operations and technical services, the key to the whole project — the order processing subsystem — was never finished.

A former Computer Partners consultant close to the project says the entire effort was far too complex and beyond his company's capabilities. Though the consultancy enjoys an excellent reputation for handling numerous complex implementations, this one was simply beyond its scope. "The dynamics of system development change so fast that a project that takes three years to complete is self-defeating," the source says. "Modifications start to overtake the original design."

The project encompassed too many applications, all to be accomplished in a compressed time frame, according to the consultant. The interdependencies caused a logjam — Part X could not be finished because System Y was not yet running. And there were too many System Ys. The project developer ended up spending too much time on redesign and not enough on coding and testing the system.

"The consulting firm was not at a level of expertise with that technology," the former Computer Partners consultant says. "If Wang had checked into what Computer Partners was recommending, it would have found little experience in that area."

Who's paying attention?

What happened at Wang can be seen as a classic problem for a business growing too fast. No one paid attention to what was going on in revenue tracking, according to Sweet.

At the time, small consulting firms like Computer Partners were being employed throughout Wang to handle various systems projects. Internal MIS was very small and not overly involved in these projects, according to Sweet. In fact, the biggest problem was simply that Wang executives had no idea what they wanted and had no strong internal MIS staff to lean on.

In the 1970s, anyone who wanted one had a Wang 2200 system and could bang out code to create his own applications. Senior management did not track what was being created and how much it cost. Independent accounting and tracking systems popped up throughout the company.

The former Computer Partners consultant estimates that it cost Wang $10 million to correct the situation left by Computer Partners. "There was a gross misunderstanding of the computing resources that such a complex system would take," the source says.

Wang's Sweet would not release estimated costs but acknowledges that it was far more than top management wanted to pay. At the center of the problem was a complicated data base package, which both Wang and Computer Partners underestimated in terms of complexity and resources usurped.

Despite the failure, Wang maintains a cordial relationship with the consulting firm, and members of the revenue tracking project were phased out slowly over several months.

"We were trying to change too many things and create too many systems at once," Sweet says.

Though the project was reportedly finished internally at Wang, the problems in revenue tracking continued for years afterward. Wang, in fact, is currently in the process of redoing its entire order processing system again in hopes of putting this damaging problem to rest once and for all.

First Boston Corp.

Sometimes the technology works just fine, but the strategic information system turns into a disappointment because of mistakes in the marketing approach. That is the story of Shelternet, a mortgage banking network developed by First Boston Capital Group in Tarrytown, N.Y.

The network was launched in 1983 to allow home buyers to search for the best mortgage rates and apply for a mortgage by using an IBM Personal Computer at their real estate broker's office [CW, Sept. 5, 1983].

Users dial into an IBM 4381 host on CCITT X.25 packet-switching networks, according to Bob Hutchinson, vice-president of DP at First Boston Capital Group.

But Shelternet, like a lot of computerized loan origination systems that followed, did not prove very popular with home buyers or real estate brokers, according to mortgage banking experts.

"It simply ignored a critical facet of the business, which is that the customer usually wants face-to-face contact with whoever is going to process the loan," says Fred Portner, senior vice-president of Furash & Co., a management consulting firm in Washington, D.C., that specializes in financial services.

"That wasn't so much a technological failure as a failure to understand how the business is done. They tried to eliminate the human interface, and you can't do it," he says. In addition, Shelternet's original $16,000 service fee was too expensive for many real estate brokers, Portner says.

"Simply putting a PC in a broker's office doesn't mean the salespeople are going to use it," adds Dall Bennewitz, a senior vice-president at the U.S. League of Savings Institutions in Chicago. "Regardless of what appeared on the screen, they would steer the customer toward the [mortgage company] that could get the deal wrapped up."

Beset by these and other problems in its first two years of operation, Shelternet was gradually reorganized so that it acts as a conduit for other mortgage lenders in the secondary market rather than as a loan originator. Company officials downplayed the shift, calling it an expansion of the system.

The revamped Shelternet now purchases loans from about 75 originators and sells the loans to investors, according to Cecily Harrison, a spokeswoman for the parent company, First Boston Corp. in New York. In 1984, Shelternet had 125 originators.

Just last year, First Boston was forced to cut the Shelternet work force in Tarrytown by 20% because of a very soft market in real estate, Harrison says.

While First Boston's mortgage network is limping along, at least six other nationwide mortgage networks have been either discontinued or reduced to providing only rudimentary information, according to a September 1986 survey by *The Washington Post.*

"The concept of using computer terminals to originate mortgages from real estate offices still is alive," the report concludes, "but the benefits so far have not been great enough for the idea to be widely accepted."

The road to ruin

The following is a checklist to follow on a surefire path to strategic disaster in MIS planning:

- Accept the first plan that comes across your desk, especially if it is ill-defined and overly ambitious.
- Allow your systems to get hopelessly outdated so that you are forced to implement massive conversions that create crisis situations within MIS.
- Misread your company's market — the inevitable result of miscommunication between MIS and top management.
- Implement MIS strategies that are inflexible and incapable of changing as the marketplace changes.
- Push for a centralized MIS strategy when the company is going through a major decentralization campaign.
- Employ technology that is overkill, much more powerful and expensive than corporate applications require.
- Allow top management to dismiss MIS participation in forming corporate strategy.
- Operate in a vacuum. Focus on technical elegance in lieu of corporate needs and direction.
- Depend on other sources for the integrity of your data.
- Rely on consulting firms without thoroughly checking references and business plans to make sure that firm is capable of handling your project.
- Let fast business growth blind you to MIS needs.

IRS ruling raises cloud over contract work status

BY DAVID A. LUDLUM
CW STAFF

The U.S. Internal Revenue Service recently disclosed a private ruling that further complicates the already complex standards for determining when organizations can hire technical service workers as independent contractors.

In a "private letter ruling" handed down in November 1987 and published early this year, the IRS ruled that a contract technical service worker who had been placed at a utility company by a broker should be classified as an employee of the utility rather than as an independent contractor or an employee of the broker.

Private letter rulings do not establish precedents and are intended only to advise the parties that request them. However, they are widely followed by tax specialists for indications of future, binding IRS rulings.

The latest ruling raises the prospect that as a result of Section 1706 of the Tax Reform Act of 1986, organizations using contract technical workers may be liable for back taxes and penalties if an audit determines that they should have classified the workers as their employees.

Section 1706 has caused turmoil among independent contractors and the brokers that place them in jobs by requiring many of the contractors to become employees of a broker.

However, the IRS has previously suggested that it would not require contractors to be classified as employees of the client companies at which they work.

In August 1987, the IRS issued a private ruling involving computer programmers that is nearly identical to the one it issued for the utility worker.

Both rulings appear to contradict a binding, general revenue ruling the IRS issued last year.

IRS officials were not available for comment.

The general revenue ruling states that, because of the so-called safe harbor law passed by Congress in 1978, "no inference should be drawn with respect to whether [a worker] is an employee of the client for federal employment tax purposes."

The private rulings "appear rather inconsistent with the revenue ruling that came out in May," said Allen Bradley, an attorney with the Atlanta firm of Morris, Manning and Martin, which represents brokers as well as client companies.

The private letter ruling suggests that clients of technical service brokers could be found liable for back employment taxes for misclassified workers, along with penalties, according to Bradley.

"In the past, everyone assumed the broker was the one at risk. This letter ruling suggests that the client also runs a risk," he said.

But Bradley said other provisions of the safe harbor law might provide clients with legal means of circumventing the standards used to determine whether a worker should be classified as an employee.

Such companies would have to apply the safe harbor law to their own situations, he said.

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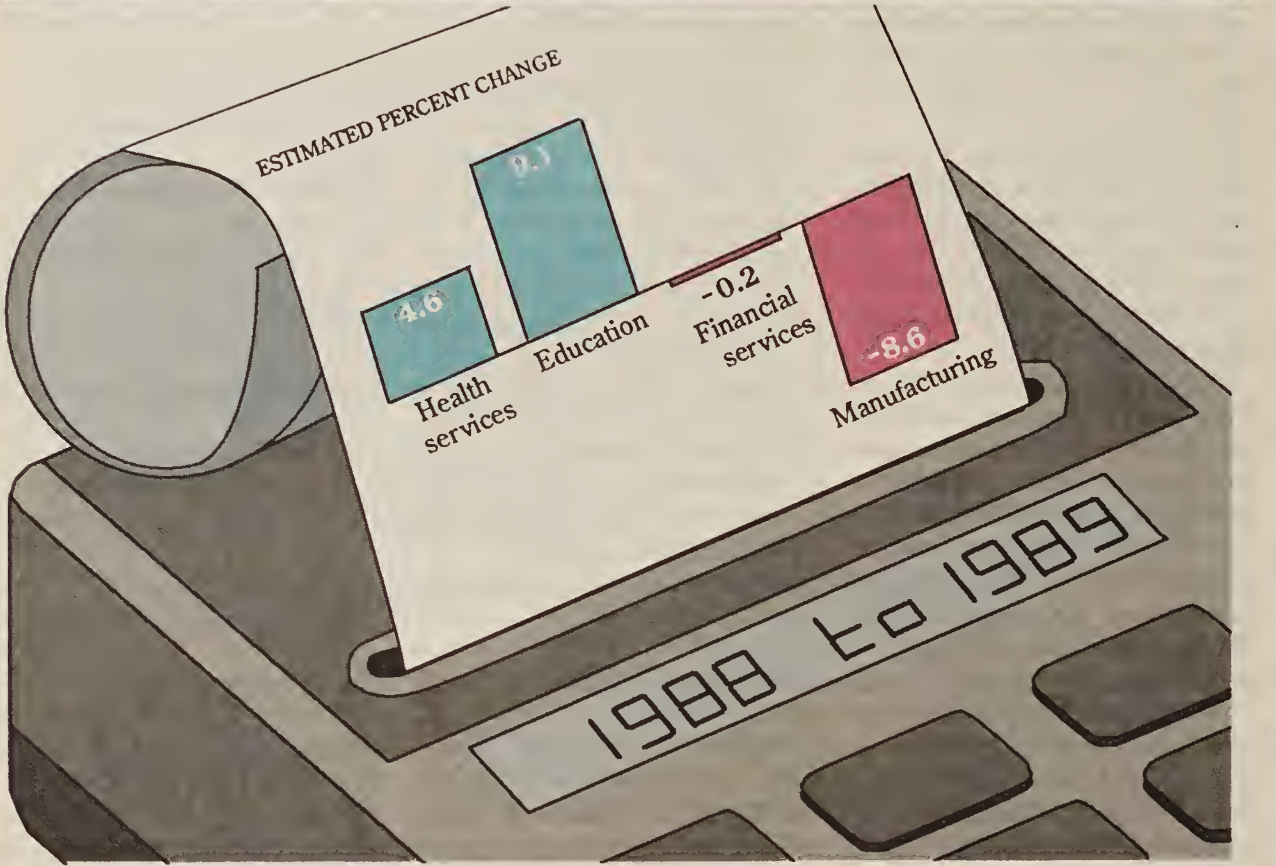
TRENDS

DP spending

'88 budget changes will total up according to industry



Companies in different industries reported decidedly mixed views on the course of their information systems spending in the coming year, according to a recent survey by International Data Corp. (IDC).

Manufacturers projected a sharp reduction a year from now, while educational organizations said they expect a dramatic increase. Health services organizations projected a gain, while financiers expected a slight dip.

The figures come from surveys of U.S. MIS managers conducted in November and December 1987.

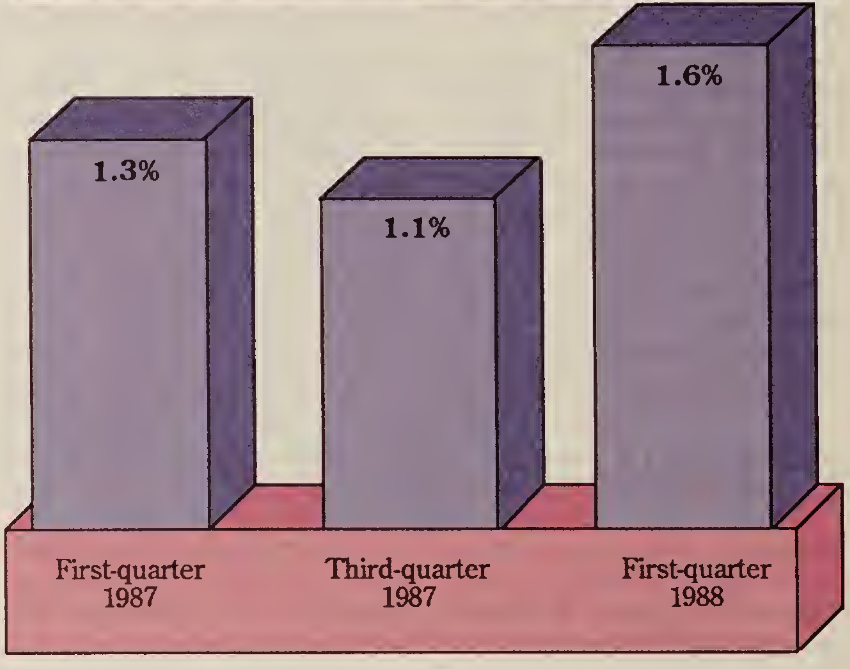
The surveyed companies, excluding banks, said they plan to devote 1.6% of revenue to information systems this quarter, up from 1.1% reported during last year's third quarter. The third-quarter figure fell from 1.3% six months earlier.

Although companies planned to increase the portion of revenue spent on systems in the first quarter, they projected a slowdown in the future growth of actual spending. They predicted a 1.2% increase during the coming year, down from the 5.2% 12-month increase projected prior to last year's third quarter.

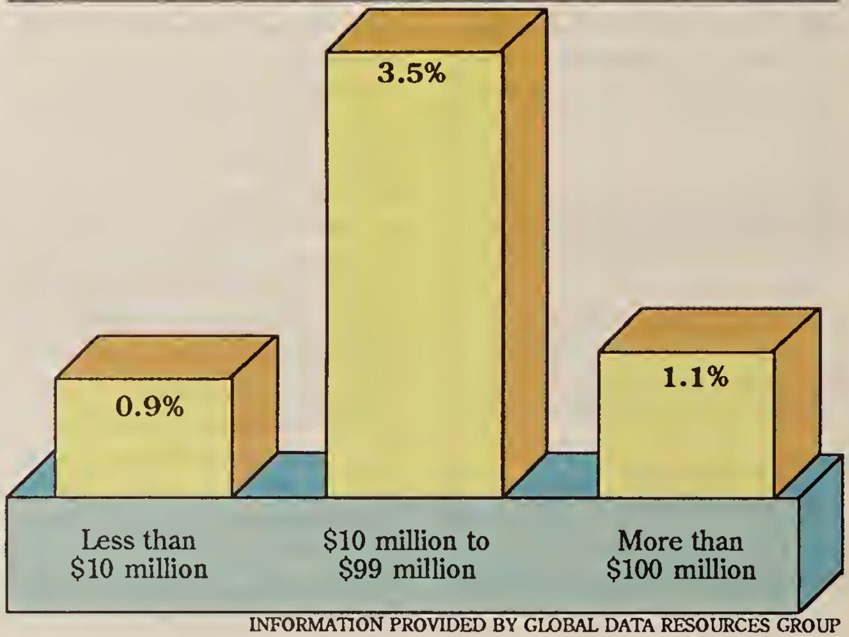
By far the greatest rates of growth, 3.5%, were projected by mid-size companies. The overall decline in projected growth stems largely from cutbacks by large manufacturers, banks and other financial services firms, according to IDC.

DAVID LUDLUM

Systems spending as percent of revenue



'88 spending growth by company size



INFORMATION PROVIDED BY GLOBAL DATA RESOURCES GROUP
CW CHARTS: AMY J. SWANSON

INSIDE LINES

Peeking over the horizon. Sun Microsystems will launch its Intel 80386-based workstation April 6, according to sources close to Sun. The system, to be called the 386I, will run both Microsoft's MS-DOS and Unix. It will be offered in both a 3.5-MIPS version, to be called the 386I/150, and a 5-MIPS version, to be called the 386I/250. Sources say Sun officials have yet to determine final prices for the systems but have agreed that they will be in the $8,000 range.

Down the HP path. Hewlett-Packard is set to introduce a microcomputer version of its HP 3000 series minicomputer, probably in April. The HP 3000LX, as it is supposedly called, would cost around $12,000, support six to eight users and offer 400M bytes of main memory; it is designed to compete with DEC's Microvax II and IBM's System/36. The 3000LX is said to be 386-based, with a footprint size not much bigger than that of HP's Vectra PC line.

When demand exceeds supply . . . IBM already faces a 12-month backlog on its 3174 controller, says a source who notes that users can expect a corresponding "fairly radical" price jump in 3274 lease pricing. And while the current version of the 3174 requires users to choose either asynchronous or IBM Token-Ring capability, an upgrade is in the works that will allow users both options.

Sperry revisited. Unisys plans to unveil in New York tomorrow more powerful models in its 2200 series of medium-size mainframes, which the firm announced one year ago. Unisys confirmed a report that the computers will be called the 2200/400 and will effectively replace the firm's 1100/70 and low-end 1100/80 models, although Unisys will continue to offer those machines. The new models will be priced at 25% less than comparable IBM 9370 and 4381 models, a Unisys spokesman said.

One of these days. IBM will make its diskless PS/2 Model 50 generally available when it can ramp up supply, according to Frank King, vice-president of development for IBM's Entry Systems Division. The diskless units use the same set of parts as the Model 50, and King predicted that by the end of the second quarter, the supplies will be in balance.

Time to fish or cut bait. Rumors that Ashton-Tate and Interbase are about to announce a partnership keep coming. Information from a source last week, combined with a wink from an Ashton-Tater, lends credence to the reports. There is also a certain amount of logic behind the deal. Ashton-Tate already has an IBM OS/2 data base server product that Microsoft and Sybase were nice enough to provide. A deal with Interbase could give Ashton-Tate an entry into the DEC VAX market.

Twisted sisters sewing session. The IEEE 802.3 work group on 10M bit/sec. Ethernet over twisted-pair wire is expected to make a standard presentation to an IEEE plenary session Thursday. The work group is considering three proposals and will meet for two days prior to passing its recommendation on. The parent committee will then measure the proposal against three criteria: market need, distinct identity from other standards and compatibility with the 802.3 standard. If all goes well, a draft will be ready for balloting in November. It is expected to take another year and a half before the work group's recommendation becomes a full-fledged standard.

Invest in chips. Shortages of Intel's 80386 chip may drive prices up as radically as the current 100% to 300% increase in dynamic RAMs. The "386 chips could, in 1989, be as hard to get as memory chips are today," predicts the "Technologic Computer Letter." All this means that prices for older systems will continue to drop, while chip shortages and higher hardware demands in running OS/2 will make it more expensive than ever for state-of-the-art PCs.

We don't do Section 1706 in this corner — we let the editor handle those letters — but any other hot items on your mind are more than welcome. Call the Computerworld hot line at 1-800-343-6474 and ask for Pete Bartolik.

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